ECON MANAGEMENT VISION

经管视野

ISSUE **007** JAN 2019 http://sem.tongji.edu.cn

近千名专家学者聚同济 共话“科技促进发展”

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AACSB ACCREDITED · CAMEA 中国高质量MBA教育认证 · EFMD EQUIS ACCREDITED · ASSOCIATION AMBA

经管视野
ECON MANAGEMENT VISION

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网址 URL
中文 http://sem.tongji.edu.cn/semch/?page_id=24113
EN　http://sem.tongji.edu.cn/semen/?page_id=14744

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同济经管
TONGJI SEM

In the fourth round of national discipline evaluation,
the first-level discipline of Management Science of Engineering was rated A+,
the highest in China (top 2%).

教育部第四轮学科评估结果

同济经管

管理科学与工程
一级学科

A+档
全国并列第一

工商管理硕士
公共管理硕士

A档

近千名专家学者聚同济 共话“科技促进发展”

第十四届中国科技政策与管理学术年会在我校召开

——设 28 个分会场，涵盖“大数据、人工智能与科技发展”“技术预见”“科技金融政策和研发财税政策”等重要议题

28 个分会场

431 篇论文

2018 年 10 月 20 日，第十四届中国科技政策与管理学术年会暨中国科学学与科技政策研究会理事会在我校召开。本次会议由中国科学学与科技政策研究会主办，我院承办，上海市科学学研究所、《科学学研究》编辑部、《科研管理》编辑部、《科学学与科学技术管理》编辑部和《Innovation and Development Policy》编辑部协办。大会以“改革开放 40 年：科技促进发展的实践探索与理论创新”为主题，吸引了来自各高校、科研院所、产业界的近千名专家学者共聚一堂。校党委书记方守恩教授、中国科学学与科技政策研究会名誉理事长方新教授为大会先后致词。大会对中国科学学与科技政策领域杰出研究人员进行表彰，颁发多个奖项，其中 8 人被授予终身荣誉会员证书。

为期两天的学术年会期间，七位专家学者以改革开放 40 周年为背景，从宏观、微观、技术研究等视角做了精彩的报告，包括穆荣平研究员的“中国创新驱动发展回顾与展望”、李垣教授的“中国企业创新 40 年”、蔡莉教授的“数字技术对创业活动影响研究回顾与展望”、柳卸林教授的“探究经济增长创新驱动的内在机制——基于新熊彼特增长理论的角度”、薛澜教授的“中国科技政策改革与发展 40 年：回顾与反思”、吴志强院士的“人工智能城市原型架构”以及贺德方研究员的“国家科技创新政策实践与思考”。

除主会场报告外，10 月 21 日还有两场主题为“面向 2035 的科技发展形势与格局展望”、“国际科技创新中心建设思考——战略与路径”的专题对话，邀请陈劲、李光、李廉水、苏竣、孙海鹰、朱春奎；蔡瑜琢、樊永刚、骆大进、吴建南、张士运参与探讨。

此外，本次学术年会设立了 28 个分会场，就相关主题进行讨论交流，如“创新体系：理论、方法与实践”、“商业模式创新与产品创新”、“科技成果产业化和创业创新”、“公共管理”、“（政）产学研融合创新合作”、“产业创新管理”、“开放式创新”、“科技管理与评价”、“大数据、人工智能与科技发展”、“科技金融政策和研发财税政策”、“科学计量学与信息计量学”、“科技传播与普及”、“技术预见”、“知识产权政策与管理”、“军民融合”、“区域创新”等。

值得一提的是，本次学术年会共收到论文 431 篇，组委会将评出优秀论文，由穆荣平理事长向优秀论文作者颁发荣誉证书，优秀论文将刊载于《科学学研究》、《科研管理》、《科学学与科学技术管理》等期刊。

（演讲报告详细请见专题 48 页）

Nearly 1,000 Experts and Scholars Gathered at Tongji to discuss

"SCIENCE AND TECHNOLOGY FOR DEVELOPMENT"

—with 28 sub-sessions in Big Data, AI and Technology Development, Technology Foresight, and Financial Policies on S&T and Fiscal and Tax Policies on R&D

28 sub-sessions

431 papers

The 14th annual academic conference of Chinese Science and Technology Policy and Management and the council of Chinese Association for Science of Science and S&T Policy were held at Tongji University on October 20, 2018. Sponsored by Chinese Association for Science of Science and S&T Policy, the conference washosted by Tongji SEMjointly with Shanghai Institute for Science of Science, the editorial offices of Studies in Science of Science, Science Research Management, Science of Science and Management of S&T and Innovation and Development Policy. With the theme of "40 years of reform and opening up: practical exploration and theoretical innovation of science and technology for development", the conference attracted nearly 1,000 experts and scholars from various universities, research institutes and industrial sectors. Professor Fang Shouen, secretary of the party committee of Tongji University, and professor Fang Xin, honorary chairman of Chinese Association for Science of Science and S&T Policy, delivered speeches for the conference. The conference commended outstanding researchers in the field of science of science and S&T policy of China, to whom multiple awards were presented including eight lifetime honorary membership certificates.

During the two-day academic conference, seven experts and scholars in commemoration of the 40th anniversary of reform and opening up, made excellent reports from the perspectives of macro and micro, technology research and so on, including researcher Mu Rongping's Development of Innovation in China: Retrospect and Prospect, Professor Li Yuan's Innovation and Development of the Chinese Enterprises in the Past 40 Years, Professor Cai Li's Research on the Impact of Digital Technology on Entrepreneurial Activities: Retrospect and Prospect, Professor Liu Xielin's Exploring the Internal Mechanism of Innovation-driven Economic Development: From the Perspective of New Schumpeter's Growth Theory, Professor Xue Lan's S&T Innovation Policies in Past 40 Years: Retrospect and Reflection, Prototype Architecture of AI City by Academician Wu Zhiqiang, and National Policies for S&T Innovation: Practice and Reflection by Researcher He Defang.

On October 21st, in addition to the main session, there were two special dialogues entitled as "Development Situation and Pattern Outlook of Science and TechnologyFacing 2035", and "Thinking about Building of the International Science and Technology Innovation Center -- Strategy and Path" which has invited Chen Jin, Li Guang, Li Lianshui, Su Jun, Sun Haiying, Zhu Chunkui, Cai Yuzhuo, Fan Yonggang, Luo Dajin, Wu Jiannan and Zhang Shiyun to participate in the discussion.

Moreover, 28 sub-sessions were set up for discussions and exchanges on relevant topics, such as Innovation System: Theory, Method and Practice, Business Model Innovation and Product Innovation, Industrialization of Scientific and Technological Achievements and Entrepreneurial Innovation, Public Administration, (Politics)- Industry-Education-Research Integration and Innovation Cooperation, Industry Innovation Management, Open Innovation, Management and Evaluation of Science and Technology, Big Data, AI and S&T Development, Financial Policy on S&T and Fiscal and Taxation Policy on R&D, Scientific Metrology and Information Metrology, Spread and Popularization of Science and Technology, Technology Foresight, Policy and Management of Intellectual Property Rights, Civil-Military Integration, and Regional Innovation, etc.

It is worth mentioning that this annual academic conference has received a total of 431 papers, among which the organizing committee will appraise and select the excellent ones. Chairman Mu Rongping will issue honorary certificates to the authors of those excellent papers, which will be published in journals such as Studies in Science of Science, Science Research Management, and Science of Science and Management of S&T.

(Please refer to the Features on page 52 for details of the speech report)

李垣：中国企业创新40年发展

李垣 教授
中国科学学与科技政策研究会副理事长、
同济大学经济与管理学院院长

一、40年来企业创新的基本判断

第一，随着改革开放的深入，企业的创新水平不断提升，我们和国际先进企业的差距在持续缩小，但未来进步空间依然很大。

第二，企业创新持续推动企业效益改进、产业提升，但依然没有实现依靠创新，特别是依靠高端技术创新带动企业发展。企业创新总体来说还是很明显地体现为市场导向，而且是由低端的市场导向带动创新，这种市场导向带来的创新不同于创业导向带来的创新。

第三，组织创新和制度创新引领。全球范围来看，中国的组织创新和制度创新并不处于劣势，而且通过组织和制度的创新引领，企业创新已经逐渐走向了全方位、各类型的创新。

第四，企业主动创新的倾向越来越明晰，企业发展开始由要素驱动向创新驱动转变，中国现在处于转换的起步阶段。

第五，随着改革开放的进一步深化和市场竞争的加剧，企业技术创新正沿着引进、消化吸收、再创新、合作创新、自主创新的路径发展。

最后，伴随着企业创新发展和国际创新的趋势，我国的企业创新研究日益活跃，影响越来越大。

基于以上基本判断可以看到，随着改革开放40年的发展，我国对创新资本的利用效率有了显著提高，提高幅度很大，但与欧美国家相比仍有相当差距，还有很大进步空间。我国劳动力技术水平也有显著提高，但与先进国家相比同样有较大差距，未来创新空间仍然很大。研发强度方面，中国曾经与欧洲国家有几个数量级的差距，但现在研发强度比肩甚至超越了部分欧洲国家，专利申请量也在快速增长。

二、改革开放 40 年不同阶段特点

对于改革开放 40 年时间段的划分标准，目前主要有两种方式。

第一种是三段划分法：第一个阶段是 1978-1992 年，过去被称为有计划的商品经济；第二个阶段是 1993-2005 年，1992 年南巡以后开始确立社会主义市场经济；第三个阶段是 2006-2018 年，2006 年开始重视创新，提出要建设创新型国家。三个阶段都有明显的特征。

第二种是四段划分法，按照经济发展阶段特征和我国的一些政策调整来划分：第一个阶段是 1978-1988 年，1978 年十一届三中全会召开，标志着改革开放元年；第二个阶段是 1989-1998 年，1988 年和 1989 年出现一些经济问题扰乱了我们的发展进程；第三个阶段是 1999-2008 年，1998 年发生了亚洲金融危机，时任朱镕基总理宣布人民币不贬值。我国经济出现暂时困难。第四个阶段是 2009-2018 年，2008 年美国出现金融危机，随之波及全球。现在谈的所有改革的问题、“三期叠加”的问题等，也都是以 2008 年为起点的。到 2018 年，改革开放 40 年，社会主义进入了新时代。

结合 40 年来中国经济表现出来的阶段特征和重大事件，可以将中国的企业创新采用四段划分的标准。

1978-1988：

努力学习，克服短缺

改革与开放是相辅相成、相互促进的，不能独立而言，如果只开放不改革，企业的创新很难得到快速发展。

第一个阶段最明显的特征就是短缺，我们的主要任务是通过开放，努力学习、克服短缺。当时从日本学习较多，如学习日本丰田公司的“看板管理”方法。当时企业主要任务是改进管理方法，增加供给，创新开始走进企业思考的范畴。我于 1982 年大学毕业以后参加了国家组织的企业厂长现代化管理方法培训班，担任助教，并在一次机缘巧合下担任了主讲人。通过这次机会，我学习了国家经委推广的国外 18 种管理方法，在后来的七、八年中一直用这些方法帮助企业改进管理方式。

在这个阶段，企业管理方面的知识极度缺乏，提高产品质量是基本的创新目标，当时还出现了著名的“张瑞敏砸冰箱”事件。那时是计划经济为主，企业管理创新以放权让利、完善承包制为主，代表人物是马胜利和汪海等。当时学界的研究主要是介绍国外的创新方法和创新理论，最典型的有两本书：一本是 1980 年马洪等编写出版的《国外经济管理名著丛书》，第二本是 1983 年朱镕基总理编写的《管理现代化》。

在这一阶段，国家政策更多关注通过调整和优化产业结构克服当前短缺，国家采取放权让利和承包制的做法鼓励企业加快生产与供给。企业的创新主要是按照国家指示来实践新的管理方法，通过模仿创新和渐进创新的方式改进生产效率。但一个很大的问题是，因为受到承包制的限制，企业的短期行为很严重。创新产出需要的时间较长，而承包是有期限的，这会导致创新动力与后劲不足，创新也并未成为企业的核心战略。

1989—1998：

引进消化，完善提高

在这个阶段，企业通过引进和消化国外技术来实现创新，重在过程创新，特别是工艺创新。1992 年市场经济体制确立以后，企业的制度创新加快，1994 年朱镕基任第一副总理以后，推动企业改制。当时提出“产权清晰、权责明确、政企分开、管理科学”的现代企业制度。在这个阶段，中国实行的是出口导向战略，企业加快出口，市场化导向增强，企业创新开始关注效率和价格，当时经常讲的价格战也和这个大的导向有关。学术界开始热议技术引进的利弊。企业当中代表性人物是张瑞敏和柳传志，其中张瑞敏是以“市场链”为纽带进行业务流程再造，也是第一次流程再造，当时人们关注的焦点是市场，其中海尔集团最先提出了服务市场的概念。另外就是国有企业，因为其体制原因，出现了邯钢“模拟市场”的经验，通过模拟市场给内部增加动力，让企业成为市场的主体。

这个阶段，国家改革思路是通过探索现代企业制度，增强企业活力。因此，企业制度创新备受关注。同时，政府为了鼓励企业管理创新，开设了企业管理创新成果奖，一直持续到现在。另外，当时市场变化很快，市场导向的创新开始受到重视，尽管那时人们的消费层次普遍较低，但部分地区的许多产品已经不再短缺。在这个阶段，主要是以引进生产线为主，消化吸收再创新的能力不足。由于缺乏自主知识来提升产品，所有不少企业大打价格战。为了加快提高企业发展自身技术水平，高新技术企业开始快速发展，但当时的一些基础条件保障不够完善。

1999—2008：

加快探索、奋起追赶

1997 年亚洲金融危机爆发。作为一个负责任的大国，朱镕基总理是有远见的，在 1998 年代表国家我国政府宣布了人民币不贬值。当时中国处境困难，亚洲金融危机对企业的后续经营造成了很大影响，当时提出国有企业要三年脱困。当时的企业经营重点是找市场，求生存。

2000 年以后出现了转机，中国加入了 WTO，市场空间迅速增大，诸多企业业绩得到迅速提升。当时的金融制度创新和国有企业的体制创新加快，释放出了更多的创新活力。另外通过广泛的合资、合作，很多企业通过创新实现了快速成长。市场在这个时期发生了变化，需求开始升级，对高端创新提出了新的挑战，我们由原来的低端创新向高端发展。在这个阶段，创新成为了国家战略，因为许多行业的短缺已经不复存在，开始出现过剩的苗头，需要提高企业创新实现产品升级。因此，对企业创新的关注越来越强调自主创新。

在这个阶段国家政策和企业创新主要有以下特点：针对自主创新不足、缺乏核心技术的缺陷，国家出台新的政策，鼓励企业自主创新。在这样的背景下，企业开始探索自主创新，民营企业和新业态的创新加速。

2009—2018：

加速创新，实现突破

2009 年应对国际金融危机到现在，从企业的外部环境来说，市场不确定性增大，中国的多数产业都出现了过剩，甚至包括现在的 AI、数字产业。经济生产方式开始从数量驱动、要素驱动向质量驱动和创新驱动转变，社会各界开始关注核心技术的创新，特别是去年到今年，如何突破核心技术已经成为一个社会问题。企业技术创新与模式创新相结合，创新渗透到企业的各个方面。这个时候引进、消化、吸收、再创新的追赶模式已经无法支撑可持续发展，国家出台了相应的政策，推动关键技术和战略新兴产业发展。这个阶段因为产业升级的紧迫性和高端竞争的加剧，企业创新向自主创新纵深发展，开始关注内部创新能力体系和外部创新生态的构建。我现在就在关注企业创新网络与生态、企业创新能力体系和创新范式（文化制度、政企关系与企业创新机制）。

三、产业创新的时代性特征

我认为，未来的企业创新应该有以下趋势：单一产品创新向生态系统创新转变；单一企业创新向联合创新、产业创新转变；企业主导创新向多主体参与创新转变；竞争创新向共享与竞合创新转变；实体产品创新向虚、实业务创新结合转变；价值单一业务的创新向价值多元业务的创新转变；单一批量式的生产方式创新向大规模私人定制创新转变。

关于中国企业的创新方式，我认为未来的模式应该选择三网融合，即物联网、务联网和关系网的融合模式。这三种网络之间的融合是未来发展的关键，它会催生许多新的商业模式，也是未来企业创新管理的一个重要研究领域。同时，未来创新的发展之路，从依赖于满足外向经济需求转向扩大内需，在新技术领域突破的同时，要加速绿色创新、包容创新和国际合作创新，形成全面创新的态势。特别是，我们的企业要结合中国转型阶段、文化特征和特殊政企关系，构建具有独特竞争优势且难以被模仿的创新生态。

在创新研究方面，应该更加重视中国企业创新的内在机制及其背后的理论，关注中国特色。另外要更加关注产业创新生态的构建和演进规律的研究。除此之外还要更加关注新技术（AI、大数据等）发展对企业创新的影响。最后关注转型国家企业如何通过创新加快国际化的问题。这些在企业未来创新方面将发挥重要作用。

（转自三思派公众号）

LI Yuan:

INNOVATION AND DEVELOPMENT OF CHINESE ENTERPRISES IN THE PAST 40 YEARS

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1. The Basic Judgments of Enterprise Innovation in the Past 40 Years

First, with the deepening of reform and opening up and the continuous improvement of innovation levels, the gap between Chinese enterprises and international advanced enterprises has been narrowing, but there is still a lot of room for progress in the future.

Second, enterprise innovation continues to promote the improvement of enterprise efficiency and industrial upgrading, but it still fails to achieve the goal of driving enterprise development by innovation, especially by relying on high-end technological innovation. On the whole, enterprise innovation is clearly market-oriented and driven by low-end market-oriented innovation, which is different from entrepreneurship oriented innovation.

Third, organizational innovation and institutional innovation are taking the lead From a global perspective, China's organizational innovation and institutional innovation are not in the dry tree, and led by organizational and institutional innovation, enterprise innovation has gradually moved towards all-round and various types of innovation.

Fourth, the tendency of enterprises to innovate proactively is becoming increasingly clear. The development of enterprises has begun to shift from factor-driven to innovation-driven. China is now in the initial stage of transformation.

Fifth, with the further deepening of reform and opening up and the intensification of market competition, technological innovation of enterprises is developing along the path of introduction, digestion and absorption, re-innovation, cooperative innovation and independent innovation.

Finally, with the development of enterprise innovation and the trend of international innovation, the research on enterprise innovation in China becomes increasingly active and influential.

The above basic judgments tell that in the wake of 40 years' reform and opening up, China has remarkably improved the utilization efficiency of innovation capital. However, compared with European and American countries, there is still a considerable gap. The technical level of Chinese labor force has also been significantly improved, but likewise there is a large gap compared with advanced countries. There is still plenty of room for innovation in the future. In terms of research and development intensity, China was once several orders of magnitude behind European countries, but now its research and development intensity is even higher than that of some European countries, and the number of patent applications is also growing rapidly.

2. Characteristics of Different Stages in Four Decades of Reform and Opening up

There are mainly two ways to divide the 40-year period of reform and opening up.

The first one is a three-stage system: the first stage was 1978-1992 and used to be known as the planned commodity economy; the second stage was from 1993 to 2005. After Deng Xiaoping's southern tour in 1992, the socialist market economy was established; the third stage is 2006-2018. In 2006, China began to attach importance to innovation and proposed to build an innovation-oriented country. All three stages have distinct characteristics.

The second one is a four-stage division in accordance with the stage characteristics of economic development and China's policy adjustments: the first stage is 1978-1988. In 1978, the Third Plenary Session of the 11th Central Committee of the Chinese Communist Party was held, marking the first year of reform and opening up; the second stage was 1989-1998. The economic problems in 1988 and 1989 disrupted our development process; the third stage was 1999-2008. In 1998, when the Asian financial crisis broke out, Premier Zhu Rongji declared that RMB would not be devalued. Our economy experienced temporary difficulties; the fourth stage is 2009-2018. In 2008, the financial crisis occurred in the United States and then spread to the whole world. The year 2008 is also the starting point for all the issues concerning reform and the "three phases of reform". By 2018, 40 years after reform and opening up, socialism has entered a new era.

In combination with the stage characteristics and major events of China's economy in the past 40 years, Chinese enterprise innovation can be divided into four stages.

1978-1988

Study hard to overcome the shortage

Reform and opening up are complementary and mutually reinforcing. Without reform, it is difficult for enterprises to achieve rapid development in regard of innovation.

The most obvious feature of the first stage is shortage. Our main task was to overcome the shortage by opening up and studying hard. At that time, we learned a lot from Japan, such as the "Kanban (Japanese) management" method of Toyota. The primary task of enterprises was to improve management methods and increase the supply, and innovation began to enter the thinking scope of enterprises. After graduating from the university in 1982, I took part in the training class of modern management methods for factory directors organized by the state, served as a teaching assistant, and acted as a keynote speaker by chance. Through this opportunity, I have learned 18 foreign management methods promoted by the State Economic Commission, and have been using these methods to help enterprises improve their management mode in the following seven or eight years.

At this stage, the knowledge of enterprise management was extremely deficient, and improving product quality was the basic innovation goal. At that time, the famous incident named "Zhang Ruimin smashes the refrigerator" took place. The planned economy was prevailing at the moment, and enterprise management innovation was dominated by the decentralization of power and improvement of the contract system. Representatives included Ma Shengli and Wang Hai. At that time, academic research mainly introduced foreign innovation methods and theories. There were two most typical books: one is the Classic collection on Foreign Economics Management written and published by Ma Hong et al in 1980, and the second is Modernization of Management written by Premier Zhu Rongji in 1983.

During this stage, the national policy were concerned about overcoming the current shortage by adjusting and optimizing the industrial structure, and the state encouraged enterprises to accelerate production and supply by means of decentralization, profit sharing and contract system. The innovation of enterprises was mainly to practice the new management method according to national instructions and improve production efficiency through imitation and incremental innovation. But a big problem was that restricted by the contract system, the short-term behavior of enterprises was very serious. Innovation output needs a long time, but contract has a time limit, which led to the lack of innovation motivation and stamina, and innovation has not become the core strategy of enterprise.

1989-1998

Introduce and digest to improve

At this stage, enterprises realized innovation by introducing and digesting foreign technologies, focusing on process innovation, especially technological innovation. Since the establishment of the market economy in 1992, institutional innovation in enterprises has accelerated. After Zhu Rongji became the first vice premier in 1994, he promoted the restructuring of enterprises. At that time, the modern enterprise system featuring "clearly established ownership, well defined rights and responsibility, separation of government and enterprises, and scientific management" was put forward. As China implemented the export-oriented strategy, enterprises accelerated their export and strengthened the market orientation. Enterprises began to focus on efficiency and price in innovation, and the price war often mentioned at that time was also related to this supreme orientation. The pros and cons of technology introduction were hotly debated in academic circles. Representative figures in enterprises included Zhang Ruimin and Liu Chuanzhi. The business process reengineering based on "market chain" carried out by Zhang Ruimin was also the first process reengineering. At that time, market became the focus, and Haier group first put forward the concept of service market. In addition, state-owned enterprises, due to systematic causes, acquainted the experience of "simulated market" of Hangang, i.e. increase internal power through the simulation of market, making enterprises the main body of the market.

The national reform idea was to enhance enterprise vitality by exploring modern enterprise system. Therefore, the innovation in enterprise systems received much attention. At the same time, in order to encourage enterprise management innovation, the government established the Enterprise Management Innovation Achievement Award, which has lasted till now. In addition, the market was changing rapidly and market-oriented innovation began to be valued for. Although people's consumption level was generally low, many products in some areas were no longer in short supply. This stage was mainly about introduction of production lines, but lacked the capacity to re-innovate through digestion and absorption. Due to scarcity in independent knowledge to improve their products, many enterprises were engaged in price war. In order to accelerate the development enterprises improved their own technological levels. High-tech enterprises began to develop rapidly, but some of the basic conditions were not sufficient.

1999-2008

Accelerate exploration and catch up

The Asian financial crisis broke out in 1997. As a responsible big country, Premier Zhu Rongji was visionary, and in 1998 he announced on behalf of the Chinese government that RMB would not be devalued. At that time, China was in a difficult situation. The Asian financial crisis had a great impact on the follow-up operations of enterprises. It was proposed that state-owned enterprises would be bailed out in three years. The focus of businesses was to find the market and survive.

After 2000, there was a turning point. China joined the WTO, and the market space magnified rapidly. Many enterprises improved fast in performance. At that time, financial system innovation and state-owned enterprise system innovation were accelerated, releasing more innovation vitality. In addition, through extensive joint ventures and cooperation, many enterprises have achieved rapid growth through innovation. During this period, the market changed, and the demand began to upgrade, posing new challenges to high-end innovation. We developed from low-end innovation to high-end innovation. Innovation becomes a national strategy, because the shortage in many industries has ceased to exist, and there were signs of surplus. Enterprises need to improve innovation to achieve product upgrading. Therefore, more and more attention has been paid to independent innovation.

The main characteristics of national policies and enterprise innovation of this stage were as follows: in view of the deficiency of independent innovation and the lack of core technologies, the state issued new policies to encourage independent innovation of enterprises. In this context, enterprises began to explore independent innovation, and the innovation of private enterprises and new industry formats accelerated.

2009-2018

Expedite innovation and achieve breakthroughs

Since the international financial crisis in 2009, the external environment of enterprises has become more uncertain, and most industries in China have capacity overhang, including AI and digital industries. The mode of economic production began to shift from quantity and factor-driven to quality and innovation-driven. All sectors of society started to pay close attention to the innovation of core technologies. Especially from last year to this year, how to break through in core technologies has become a social issue. Enterprises combine technology innovation with mode innovation, and innovation permeates all aspects of the enterprise. At this time, the catch-up model featuring introduction, digestion, absorption and re-creation can no longer support sustainable development. The state has issued corresponding policies to promote the development of key technologies and strategic emerging industries. Due to the urgency of industrial upgrading and the intensification of high-end competition, enterprise innovation began to develop in depth towards independent innovation, and pay attention to the construction of internal innovation capability system and external innovation ecology. My research is now focusing on enterprise innovation network and ecology, enterprise innovation capability system and innovation paradigm (cultural system, government-enterprise relationship and enterprise innovation mechanism).

3. The Contemporary Characteristics of Industrial Innovation

In my opinion, the future enterprise innovation should have the following trends: single product innovation turning to ecosystem innovation; single enterprise innovation changing into joint innovation and industrial innovation; enterprise led innovation transforming into multi-subject innovation; competitive innovation developing into sharing and co-opetition innovation; real product innovation switching to combination of virtual and real business innovation; innovation of single value business shifting to innovation of multi-value business; innovation in single batch mode of production changing to mass customization innovation.

As for the innovative ways of Chinese enterprises, I think the future model should be the integration of three networks, namely the Internet of things, the Internet of services and the network of relationships. The integration of these three networks is the key to the future development. It will give birth to many new business models, and it is also an important research field of the future enterprise innovation management. At the same time, the path of innovation development in the future will shift from relying on meeting the needs of the outgoing economy to expanding domestic demand. While making breakthroughs in new technologies, we need to accelerate green innovation, inclusive innovation and international cooperation innovation to create a momentum of comprehensive innovation. In particular, our enterprises should integrate China's transformation stage, cultural characteristics and special government-enterprise relations to build an innovation ecology with unique competitive advantages and difficult to be imitated.

In the aspect of innovation research, we should pay more attention to the internal mechanism and theory behind the innovation of Chinese enterprises and pay more attention to Chinese characteristics. In addition, we should attach more importance to the construction of industrial innovation ecology and researches on its evolution rule. Meanwhile, close attention should also be paid to the impact of the development of new technologies (AI, big data, etc.) on enterprise innovation. Finally, we focus on how to accelerate the internationalization of enterprises in transition countries through innovation. These companies will play an important role in future innovation.

(Reprinted from Science-Pie)

同济经管
TONGJI SEM

Eduniversal
2018 年度最佳硕士项目

房地产硕士专业
全球第 9

供应链与物流硕士专业
全球第 20

同济经管硕士专业　跃居亚洲第

Eduniversal 发布 2017-2018 全球最佳硕士项目排名，我院房地产硕士专业（Master Programme for Real Estate）跻身全球前十，相比去年上升 11 位，跃居全球第九名；供应链与物流硕士专业（Master Programme for Supply Chain and Logistics）上升 3 位，位居全球第二十名，两个专业均位列亚洲第一。

此次排名表明，我院房地产及供应链与物流硕士项目的质量已具备较强的国际竞争力和品牌知名度，其培养质量已得到国际认可。

Eduniversal 成立于 1994 年，是知名的全球商学院排名及服务机构，总部设在法国巴黎，其全球最佳硕士专业排名根据项目师资构成、雇主网络以及毕业生薪资水平、就业状况和满意度调查等指标评价得出。目前，Eduniversal 已成为法国乃至全球最受认可的高等教育排名机构之一。

我国西北缺水地区火电发展应实行取水总量控制

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我国西北缺水地区火力发电带来的水资源压力显著上升，这些地区煤电基地开发应实行“取水总量控制”措施。

近日，国际权威学术期刊《Nature Energy》以封面文章的形式在线发表了同济经管与世界资源研究所的合作研究成果“Decoupling between water use and thermoelectric power generation growth in China”（中文：中国实现火力发电增长与用水脱钩）。该文首次建立了我国长时间序列高分辨率火力发电用水地理信息数据库，揭示了2000至2015年间火电取水、耗水及其水资源压力的时空格局演变过程，并定量评估了多种影响因素对火力发电水资源利用效率提升的贡献。该研究对我国制定合理的水资源管理政策和电力工业发展政策均具有重要的借鉴意义。

无论是全球范围还是在中国，火电都是继农业灌溉之后的第二大用水部门。不断增长的电力需求持续刺激和推动火电工业的产能扩张，也造成了水资源竞争日益加剧。目前，水资源风险已经成为影响全球可持续发展的重大风险之一，而水资源也成为继大气污染排放、温室气体排放之后，电力工业面临的又一重要环境挑战。以传统的循环冷却燃煤电厂为例，每发一度电大约需要消耗两升水，其中80%左右在凝汽器冷却过程中蒸发，其余部分主要用于烟气脱硫、除灰冲渣、锅炉补水等各个工艺环节。直流冷却电厂虽然没有冷却塔蒸发耗水，但依赖持续不断的贯流式冷却水源，热效率较低的中小型机组每发一度电取水量可达100升以上，同时排放升温后的温排水，是主要的水体热污染源。

我国拥有世界上规模最大的火力发电装机，2017年总量达11.4亿千瓦（含核电），比美国高约35%。我国火电工业不仅规模增长迅速，电力生产的空间布局也发生着显著变化。近年来，随着“西电东输”工程的推进，西北地区大型煤电基地建设进展迅速，大部分新增火电产能向西北缺水地区转移。火电产能西移的发展态势对当地水资源和水环境的影响，引起了广泛关注。

研究首先构建了一个完整的时间序列发电机组地理信息数据库，约涵盖99%的全国火力发电装机容量，并根据中国发电机组用水样本数据，建立了用水强度多元回归模型，在此基础上，计算了具有详实地理信息的火力发电取水、耗水清单。研究发现，全国范围内，位于水资源高压力区（水资源压力指数大于0.4，该指数反映了流域内取水量与可利用水资源量的比值）的火力发电量从2000年的0.64万亿度（占当年全国火力发电总量58.5%）增长到2015年的2.89万亿度（占66.5%），增加了3.5倍。在我国十个水资源一级区中，覆盖新疆、内蒙古西部等地区的西北诸河流域增幅近14倍，是新千年以来火电产能扩张最快的一级区。而其中位于以沙漠和戈壁地貌为主的干旱地区的火力发电量，则从不到50亿度增长到近1000亿度。

为了应对产能激增和空间布局变化带来的水资源风险，我国出台了一系列管理政策，促进电力工业用水效率的提升。例如，北方缺水地区新建机组推广空冷技术替代水冷、沿海地区推广海水冷却替代淡水、提高准入标准实现机组大型化、提高火力发电取水定额标准促进节水技术的应用、加快淘汰能源和水资源效率较低的老旧机组等。研究发现，得益于多种政策的共同作用，我国火力发电的技术结构发生了巨大变化，技术效率得以持续改进。全国火力发电的淡水取水总量在2011年达到673亿立方米的峰值，约占当年全国取水总量的11%，此后持续下降，实现了取水总量与火力发电量增长的“脱钩”。与此同时，耗水总量的增幅也明显放缓。在各类影响因素中，冷却技术结构的变化对取水总量“脱钩”的贡献在70%以上。这一点在西北诸河流域体现得最为明显。空冷技术是2007年以后才开始在西北地区发展起来的，到2015年，空冷电厂发电量已经占到西北诸河流域火力发电总量的69%。可以说，在带有强制性的技术政策约束下，西北地区绝大多数新建电厂均采用了这一节水技术。

虽然总体上我国火电工业取得了显著的节水成效，但由于我国水资源的空间分布极不平均，能源开发热点地区的水资源压力仍将持续，潜在水风险不容忽视。研究发现，在2000-2015年间，海河流域大部分地区火电水资源压力指数明显下降，而西北大型煤电基地所处汇水区则显著上升，特别是准东、伊利、哈密等煤电基地增幅最大。个别汇水区的火力发电取水量已经超过了当地多年平均可利用地表水资源量，能源发展与可持续水资源利用的矛盾较为突出。促进能源与水资源系统的协同规划与管理是缓解火电水资源压力的根本途径。

本文的第一兼通讯作者，同济大学经济与管理学院副教授、联合国环境署-同济大学环境与可持续发展学院跨学科教授张超表示，未来我国电力工业的发展将面临越来越多的资源环境约束，目前，大气污染物排放和碳排放的问题已经引起了充分重视，但电力工业的水资源问题直到近几年才开始被关注。国家能源局2018年5月发布的《2021年煤电规划建设风险预警》显示，新疆、内蒙古、宁夏等西北地区煤电开发的资源约束情况全部为绿色。虽然文件指出该指标考虑了大气污染物排放、水资源、煤炭消费总量等因素，但由于缺乏分要素评价结论，无法准确地反映煤电基地所处地区的水资源和水环境承载力信息。另一方面，如果单纯从建设供水工程以保障能源项目用水需求的角度出发考虑问题，容易陷入部门本位思维。在未来规划和管理中，应关注电力工业发展对流域及区域水循环的整体影响，借助更加完善的用水计量手段，在极度缺水地区考虑引入取水总量控制等更加严格的措施，推动水资源管理的精细化和系统化。

"The water resource pressure brought by thermoelectric power generation in the water-short area—northwest of China has increased significantly, where a measure of "total quantity control of water" should be implemented in the development of coal and electricity base."

Thermoelectric power development in China's arid northwestern regions could implement ***"WATER WITHDRAWAL CAP"***

ZHANG Chao
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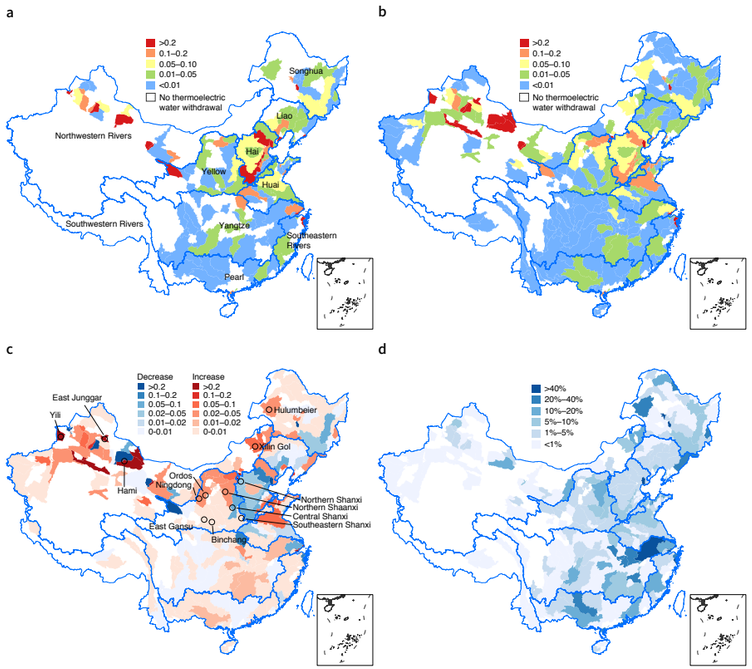
"Decoupling between water use and thermoelectric power generation growth in China" was recently published online in the form of a cover article by Nature Energy, an international authoritative academic journal. This paper, for the first time, establishes a high-resolution geological information database of water use for thermoelectric power generation in China with long time series, reveals the evolution process of space-time pattern of water intake, water consumption and water resource pressure from thermoelectric power generation between 2000 and 2015, and quantitatively evaluates the contribution of various influencing factors to the improvement of water use efficiency of thermoelectric power generation. This study has a great reference significance for China in policy formulation relating to reasonable water resource management and power industry development.

Both globally and in China, thermoelectric power is the second-largest sector for water usage after agricultural irrigation. The growing demand for electricity continues to spur and drive capacity expansion in the thermoelectric power industry, creating increasing competition for water resources. At present, water resource risk has become one of the major risks affecting global sustainable development, and water resource has also become another important environmental challenge faced by the power industry following air pollution emission and greenhouse gas emission.Taking the traditional circulating cooling coal-fired power plant as an example, about two liters of water are consumed per kilowatt-hour, of which about 80% is evaporated in the condenser cooling process, and the rest is mainly used for processes such as flue gas desulfurization, ash scum removal and boiler water replenishment. Although the DC cooling power plant isn't water-consuming as much as cooling tower's evaporation, it relies on continuous through-flow cooling water source. The small and medium-sized units with low thermal efficiency consume more than 100 liters of water per kilowatt-hour, meanwhile, discharge warming drainage which is the main source of thermal pollution in water.



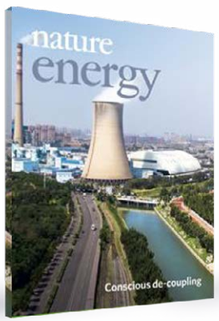
Evolution of spatial distribution of water resources pressure caused by thermal power extraction

China has the world's largest installed thermoelectric power generation capacity, with a total of 1.14 billion kilowatt (including nuclear power) in 2017, about 35% higher than the United States. China's thermoelectric power industry not only rapidly grows in scale, but also significantly changes in the spatial distribution of power production. In recent years, with the promotion of the "west-east power transmission project", the construction of large coal power bases in northwest China has made rapid progress, and most of the new thermoelectric power production capacity has been transferred to the water shortage area in northwest China. The influence of the westward shift of thermoelectric power capacity on local water resources and water environment has attracted wide attention.

The research firstly built a complete geographic information database of time series generator set covering about 99% of the thermoelectric power installed capacity, and established a water withdrawal intensity multivariate regression model according to the sampling data of China water generator set, on the basis of which calculated the water withdrawal and consumption list of thermoelectric power containing detailed geographical information. The study found that the thermoelectric power generation of the high water pressure zone (where water pressure exponent is greater than 0.4, the index reflects the ratio of withdrawals and available water resources in certain basin) across the country grew from 0.64 trillion kwh in 2000 (accounting for 58.5% of the total national thermal power that year) to 2.89 trillion kwh in 2015 (accounting for 66.5%), increasing by 3.5 times. Among the ten first-level water resources regions in China, the northwestern river basins covering Xinjiang, western Inner Mongolia and other regions increased by nearly 14 times, which is the first-level region with the fastest expansion of thermoelectric power production capacity since the new millennium among which the thermoelectric power generation in arid regions dominated by desert and Gobi landforms grew from less than 5 billion kwh to nearly 100 billion kwh.

In order to cope with the risk of water resources caused by the production capacity surge and spatial distribution change, China has issued a series of management policies to promote the improvement of water efficiency of power industry. For example, new units replacing water cooling with air cooling technology in water-scarce areas in north China are being built, seawater cooling replacing fresh water in coastal areas is being promoted, access standards are being raised to realize the upsizing of units, water intake quota standards for thermal power generation are being raised to promote the application of water-saving technology, and old units with low efficiency of energy and water resources are being eliminated in a rapid pace.It is found that thanks to the combined action of various policies, the technical structure of China's thermoelectric power generation has changed greatly and the technical efficiency has been improved continuously. The total amount of fresh water intake for thermoelectric power generation reached a peak of 67.3 billion cubic meters in 2011, accounting for about 11% of the total amount of water intake in the country that year, and it continually decline realizing the decoupling between water use and thermoelectric power generation.At the same time, the increase in total water consumption has slowed down significantly. Among various influencing factors, the change of cooling technology structure contributes more than 70% to the "decoupling" of total water intake which reflects most obviously in the northwestern river basin. Air cooling technology started in northwest China from 2007, while had accounted for 69% of the total thermoelectric power generation in the northwestern river basin by 2015. It can be said that under the constraint of mandatory technical policy, most new power plants in northwest China adopt this water-saving technology.

Although China's thermoelectric power industry has achieved remarkable water-saving effect on the whole, due to the extremely uneven spatial distribution of water resources in China, the pressure on water resources in energy development hot spots will continue, and the potential water risks should not be ignored. The study found that, from 2000 to 2015, the pressure index of thermoelectric power water resources in most areas of Haihe river basin decreased significantly, while the catchment area where large coal power bases located in northwest China increased significantly, especially the coal power bases such as east Junggar, Yili and Hami increased the most. The amount of thermoelectric power generation in individual catchment areas has exceeded the local average amount of surface water resources available for ages, presenting a severe contradiction between energy development and sustainable water resource use. It is the fundamental way that promoting the coordinated planning and management of energy and water resources system to relieve the pressure of thermoelectric power water resources.



First and corresponding author of this article – ZHANG Chao, associate professor of School of Economics and Management, Tongji University, interdisciplinary professor of UN Environment-Tongji Institute of Environment for Sustainable Development, said that the future development of power industry in China will face increasing resources and environment constraints. At present, the atmospheric pollutant emission and carbon emissions has caused full attention, while water resource problems in power industry haven't been taken into account until recent years. Risk Warning on the Coal Power Planning and Construction in 2021 issued by the National Energy Administration in May 2018 shows that resource constraints on coal power development in Xinjiang, Inner Mongolia, Ningxia and other northwestern regions are all green. Although the document points out that the index takes into account factors such as the emission of air pollutants, water resources, total coal consumption, etc., it cannot accurately reflect the information of water resources and water environment carrying capacity of the region where the coal power base is located due to the lack of factor evaluation conclusion. On the other hand, if we consider the problem from the perspective of building water supply projects to guarantee the water demand of energy projects, we may easily fall into the department-based mindset. In the future planning and management, attention should be paid to the overall impact of the development of power industry on the water circulation in river basins and regions, and more stringent measures such as the total water intake control should be taken with the help of better water measurement methods in extremely water-deficient areas, thus to promote the refinement and systematization of water resource management.

滋养还是侵蚀女性领导价值？

——象征主义任命与临危受命的连锁效应

互联网蓬勃发展、人才为导向的创新创业时代，女性领导不仅在社区建设方面作用显著，在组织财务绩效、社会绩效、组织创新与危机处理等方面的价值也至关重要。但从整体而言，目前女性领导代表仍然不足。从国内数据看，2017 年，中国妇女劳动参与率已超过 70%，远高于其他国家，然而在公司董事会级别的女性人数占比仅为 9.4%。从全球范围看，女性在领导层的占比仅为 20%，并且随着管理层级的上升而减少。女性领导价值发挥的前提是女性人才能够晋升到领导职位，在社会、文化、制度等的影响下，在女性领导的职场会遭遇困境。在商业环境中，多数企业仍是以男性主导居多，加之社会性别偏见的制约，除了与消费者联系紧密的服务业外，大部分企业女性领导任命仍然困难重重。

所以在组织实践中女性领导的任命显得尤为重要。象征主义任命、临危受命作为女性领导任命中两种典型的职场境遇，凸显了重新审视女性领导代表变化的解释，补充性别与领导之间的关系探讨，推进企业性别平等的重要意义。

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象征主义任命

女性领导的象征主义任命可以界定为仅将女性领导者作为性别代表的一种任命动机。在组织中占比不超过 15% 的群体为组织中的象征主义者，与之相对应的另一个群组则为组织中的主导者，主导者在数量上占优势，并控制着组织及其文化。在美国 500 强企业中仅有 32 家企业由女性掌权，女性 CEO 比例仅为 6.4%。在中国企业董事会中，中国女性董事占比为 10.7%，其中 A 股上市企业董事会由女性担任董事会主席的仅为 5.4%。女性领导在全球范围内的企业中所占比例明显低于 15%，在组织中男性是主导者，女性则为象征主义者且象征主义身份明显。

这种象征主义任命主要体现在三个方面：

（1）女性领导者在领导群体中的数量偏低，女性领导者在组织中具有高度地可见性——这种高度可见性为女性领导者带来了绩效等方面的压力；

（2）女性领导者在组织中的性别地位偏低，男性领导者会刻意地抬高性别边界、有意识地疏离女性领导者，这就进一步地加剧了男女领导之间的权力不平等；

（3）社会和组织对女性担任领导者存在性别偏见，这导致了女性领导在组织中会遭遇男性领导者带来的自身角色的扭曲。

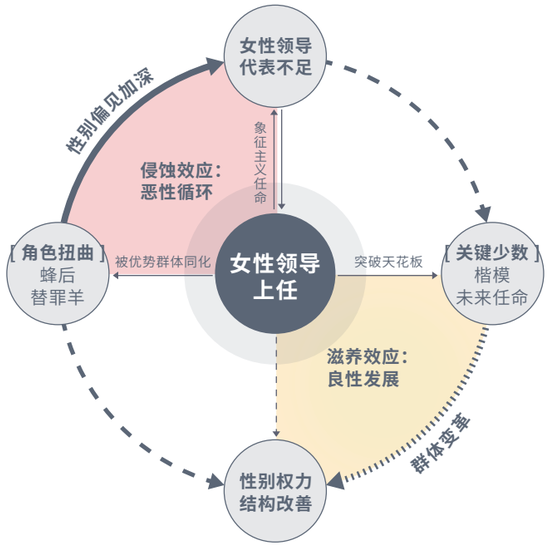
临危受命

女性领导在组织危机时刻上任所体现的是一种临危受命的任命动机，由临危受命引发的女性领导任命即为“玻璃悬崖”。例如，2013 年 7 月，玛丽莎·梅耶尔（Marissa Mayer）出任雅虎 CEO 时，雅虎正面临财务状况堪忧、企业收入下滑、核心业务衰落、人才流失严重等问题。2014 年玛丽·巴拉 (Mary Barra) 升任通用汽车 (General Motors) 首席执行官未满一个月内，通用汽车因点火开关缺陷而面临大规模召回的组织危机。处于“玻璃悬崖”之上的女性突破了玻璃天花板后，的确更有可能在危机时刻成为领导，更容易遭受失败的后果。正如梅耶尔和巴拉在被任命时，组织已经存在危机。但上任后，却不得不承担不可避免的危机带来的风险和责任，个人也受到怀疑和抨击。这是一种不稳定、高风险的情境，女性突破了玻璃天花板，晋升到较高的职位，在工作中会也难以被平等对待，她们获得的授权也相对较少，很难像男性那样行使权力，并且不太可能参与影响广泛的决策制定。

女性领导任命的连锁效应

这两种典型的女性领导任命，象征主义任命从女性领导的性别身份出发，将其作为女性群体的代表符号；而临危受命则重点在于组织危机的情境，将任命非传统性领导作为组织释放变革的信号。前者很容易导致女性领导成为“蜂后”，疏离同性，适应男性文化；而后者则将女性领导推上“玻璃悬崖”，成为组织危机的“替罪羊”，不得不承担高风险和压力。女性领导接受象征主义任命，促使不合理的组织性别秩序得到进一步延续；临危受命的女性领导需要承担高失败率。当女性领导失败时，甚至会带来外界的归因偏差和性别偏见的深化。

较之“玻璃天花板”，女性领导在接受象征主义任命后，突破“玻璃天花板”晋升到组织高层，但却面临着被优势群体同化、更高的压力等困难；“蜂后”角色带来的女性群体关系疏离进一步阻碍了多数女性打破“玻璃天花板”；以临危受命作为晋升机遇的女性领导，在“玻璃悬崖”上处境艰难，“玻璃悬崖”成为了另一种“玻璃天花板”。同时，象征主义任命与临危受命的任命方式还会引发女性领导在组织中的个体角色发挥与行为表现、女性群体关系与组织动态环境之间的变化与连锁效应（如图 1 所示）。这种效应需要从负面的侵蚀性和正面的滋养性两个方面进行考虑。



首先，在女性领导代表不足的情境下，象征主义任命与临危受命都不是基于女性价值而委以重任的，因而在男性主导的组织中，这种“形式”上的任命会使得女性领导成为优势群体中的劣势代表，引发自身角色的扭曲，进一步加深性别偏见，导致女性领导在组织高层代表不足的状况形成恶性循环；其次，在长期的社会文化背景影响下，女性领导代表不足的现状还需要较长时间才能得到改善。通过这种任命使得一些女性突破职业发展的天花板，获得职业晋升，也是一种机会。被任命的女性领导作为组织中女性群体的“关键少数”，发挥积极的示范作用，成为基层女性楷模，增进企业未来女性人才梯队建设，即为滋养效应。

管理启示

在现实组织情境中，以象征性的性别符号或以组织危机情境下任命动机在国内外组织实践中都是存在的。而相较于验证现象的存在，更重要的是企业应如何应对女性领导任命中所引发的连锁效应，减少“侵蚀”作用并释放“滋养”作用。首先，在男性主导的组织中，应当规范透明高层领导的选拔机制，重视人才能力与优势，尽可能的避免“象征主义”、“临危受命”等现象的出现，侵蚀组织高层未来性别权力结构的平衡发展；其次，重视女性领导任命的价值，重新考虑在推进组织性别多样化、提高高层女性比例与董事会成员性别比例方面的作为，帮助减轻高层女性压力，减少企业中女性人才的流失，使企业中的女性获得更多的组织支持以便发挥自身价值；再者，释放女性领导任命中的滋养能量，发挥在任女性领导的楷模效应，利用导师支持、职业成长计划、女性职业发展项目等形式帮助职场中的女性提高如何应对和处理特殊情况的能力并激发女性动力与潜能。支持女性职业成长，树立激励典范，帮助女性领导参与组织与社会的性别平等事业，分享职场经验，为女性群体发声，从而增强基层女性的认同感与群体成功可获得性的感知，带动群体变革。最后，女性自身也应当意识到组织中身份的动态性，通过调整自我认知、加强群体联系、寻求社会支持等策略来应对职场价值陷阱与挑战。

NOURISHING OR ERODING FEMALE LEADERSHIP VALUE?

The Chain Effect of Symbolism Appointment and Emergency Appointment

LUO Jinlian
Professor of Tongji SEM, Doctoral Supervisor

In the new era of Internet booming and talent-oriented innovation, female leaders not only play a significant role in community building, but also show critical value in the financial performance, social performance, innovation, and crisis management etc. of organizations. But overall, the current female leader representation is still insufficient. According to domestic data, in 2017, the labor participation rate of Chinese women has exceeded 70%, which is much higher than other countries. However, the percentage of women at the company's board level is only 9.4%. From a global perspective, women account for only 20% of leadership positions and the proportion decreases as the management level rises. The female leadership value can be played on the premise that female talents are promoted to leadership positions; however, under the influence of society, culture and system, they may face difficulties in the workplace of female leaders. In business environment, most enterprises are still dominated by males. With the constraints of gender bias, the appointment of female leaders is still quite difficult in most enterprises except for the service industry which is closely connected with consumers.

Therefore, the appointment of female leaders is particularly important in organizational practices. As two typical workplace situations for female leaders, symbolism appointment and emergency appointment have highlighted the significance of reexamining the changes in female leader representation, complementing the discussions on relationship between gender and leadership, and promoting gender equality in enterprises.

Symbolism Appointment

The symbolism appointment of female leaders can be defined as an appointment motivation that only takes female leaders as gender representations. Less than 15% of the groups in organizations are symbolists; while the remaining groups are dominants in the organization who prevail in number and control the organization and also its culture. In the U.S., only 32 of the top 500 companies are controlled by women, and the proportion of female CEOs is only 6.4%. Among the boards of directors in Chinese companies, the proportion of female directors is 10.7%, of which only 5.4% of the boards of directors of A-share listed companies are chaired by women. Female leaders account for significantly less than 15% of companies worldwide, with men being the dominant players in organizations. Women are symbolists and have clear symbolic identities. This symbolism appointment is mainly reflected in three aspects: 1) The number of female leaders in the leadership group is low, and female leaders are highly visible in organizations – this high visibility brings performance and other pressures for female leaders; 2) Female leaders have relatively low gender status in organizations, and male leaders may deliberately raise gender boundaries and consciously alienate female leaders. This will further exacerbate the imbalance of power between men and women; 3) Society and organizations have gender bias against female leaders. Thus, they may encounter role distortion in organizations which is imposed by male leaders.

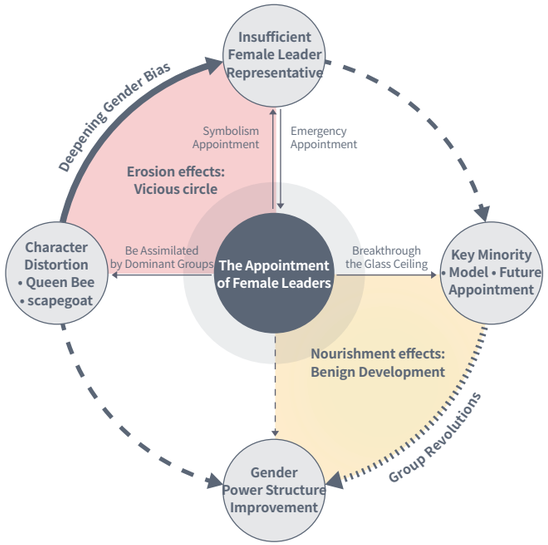
Emergency Appointment

The appointment of female leaders during an organizational crisis represents a kind of motivation for emergency appointments. The appointment of female leaders under such circumstances is termed as "glass cliffs". For example, in July 2013, when Marissa Mayer took the position as the CEO of Yahoo, Yahoo was facing problems such as awkward financial situation, decreasing corporate income, decline in core businesses, and serious brain drain etc. In 2014, within a month of Mary Barra's promotion to the CEO of General Motors, GM faced the organizational crisis of large-scale recall due to defects in ignition switches. Women who face the "glass cliff" have broken through the "glass ceiling" and thus are more likely to achieve leadership roles during periods of crisis, when the chance of failure is much higher. When Mayer and Barra were appointed, the organizational crisis had already arisen. However, after taking office, they had to bear the risks and responsibilities associated with inevitable crisis, and they were also suspected and criticized as individuals. This is a kind of unstable and high-risk situation. It is difficult for women to be treated equally in their work even if they break through the glass ceiling and are promoted to higher positions. They are given relatively less authorization and can hardly exercise power like men, and are unlikely to participate in a wide range of decision makings.

The Chain Effect of Female Leader Appointment

Among the two typical types of female leader appointment: symbolism appointment starts from the gender identity of female leaders, and take it as a representative symbol of the female group; while emergency appointment focuses on the context of organizational crisis, and considers the appointment of unconventional leaders as a signal of organizational changes. The former situation can easily cause female leaders to behave like "queen bees", i.e. alienating female staff and adapting to the masculine culture; while the latter pushes female leaders onto the "glass cliff" and makes them the "scapegoat" for organizational crises, having to bear high risks and pressures. Female leaders accept symbolism appointment which promotes the further continuation of unreasonable organizational gender order; and female leaders who are appointed in emergency situations need to bear high failure rates. The failure of female leaders will even lead to external attribution bias and deepening of gender prejudice.

Compared with the "glass ceiling", after female leaders break through the "glass ceiling" and are promoted to leadership level of the organization, they will face the challenges of assimilation by dominant group, higher pressures and so on. The role of "queen bees" brings about the alienation of female groups, which further hinders most women from breaking "glass ceiling". Taking emergency appointment as the opportunity for promotion, female leaders are in difficult situations on the "glass cliff", and the "glass cliff" has become another kind of "glass ceiling". Meanwhile, symbolism appointment and emergency appointment will also affect individual role playing and behavioral performance of female leaders in organizations, and the chain effects of the relationship between female group and organization dynamic environment (as shown in Figure 1). This effect needs to be considered in terms of both negative erosion and positive nourishment.



First, in the context of insufficient representation of female leaders, both symbolism appointment and emergency appointment are not based on women's values. Therefore, in male-dominated organizations, this "nominal" appointment will make female leaders act as "inferior representatives" in dominant groups, trigger role distortion, and further deepen the gender bias, thus leading to a vicious circle of insufficient female leader representation at the top of the organization. Second, under the influence of long-term social and cultural background, it still needs a long time before the status quo of insufficient female leader representation is improved. Through these two kinds of appointments, some female leaders could also get an opportunity to break through the glass ceiling and get professional promotion. As "key minority" of the female group in organizations, the appointed female leaders could play an active demonstration role and become models for women at the grassroots level, and promote the construction of future female talent teams in enterprises, namely the nourishment effect.

Managerial Implications

In the real-life organizational context, the motivations for symbolism or emergency appointment exist in both domestic and foreign organizational practices. Compared with the verification of phenomenal existence, it is more important for enterprises to deal with the chain effect caused by the appointment of female leaders, namely, to reduce the "erosion" effect and release the "nourishment" effect. First of all, in male-dominated organizations, we should establish a standardized and transparent selection mechanism of high-level leaders, attach importance to talents' capabilities and advantages, and try to avoid such phenomena as "symbolism" and "emergency" appointment, which may erode the balanced development of future gender and power structure of the organization's senior management. Secondly, the organization should attach importance to the value of female leader appointments, rethink the achievements in promoting gender diversity and increasing the proportion of women in senior positions and board of directors, help alleviate the pressure of female executives, reduce the loss of female talents in enterprises, and help women to get more organizational support to realize their value. Furthermore, release the nourishment energy of female leader appointments, and play the model effect of current female leaders. Take full advantage of mentor support, career growth plans, and women's career development programs etc. to help career women improve their ability to deal with exceptional cases and stimulate their motivation and potential. Support women's career growth, establish incentive models, help female leaders to participate in gender equality initiatives of organizations and society, share workplace experience, and speak out for female groups, thereby enhancing the sense of identity of grassroots women and their perception of group success, and driving the group change. Finally, women should also be aware of the dynamic nature of identities in the organization, and respond to workplace value traps and challenges by adjusting self-awareness, strengthening group connections and seeking social support etc.

草根创新
可持续驱动模式探析
——来自农民“创客”的依据

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博士生导师

国家层面的繁荣源自民众对创新过程的普遍参与，它涉及新工艺和新产品的构思、开发与普及，是深入草根阶层的自主创新。李克强总理曾说：使草根创新蔚然成风、遍地开花。作为一种接地气并富于创造性的社会运动，草根创新能够对能源、健康卫生、食物等问题产生各种解决方法，让生产和消费朝着可持续性的方向转变。

在消除贫困的过程中，众多学者都是沉浸在政府和企业的研究中，而忽视了草根创新的力量。尽管对于创新的研究很多，但是对于草根创新并没有真正学术上的研究。因此，我们以典型的草根群体——中国农民为研究对象，采用10个典型的中国农民草根创新案例，试图理解资源稀缺环境下农民“创客”的价值创造过程，并回答草根创新的形式到底是什么。

草根创新与包容式创新

经济与合作发展组织 (OECD) 指出，包容性创新是利用科学、技术和创新诀窍以解决低收入群体的需求。它包括两个方面的含义：

（1）针对低收入群体的特定需求开展创新活动，使他们能够获得并享受创新成果；

（2）低收入群体亲自参与、推动、实施具体的创新活动，在创新过程中发挥作用、创造价值，被称为“草根创新”(grassroots innovation)。

为解决生产、生活中的一些技术困难，或降低部分技术或产品的成本，以普通农民等为典型代表的收入水平和教育程度较低的草根群体开展了一系列发明、创新活动，不仅创造了经济价值，还带动了社会经济效益。和一般创新不同的是：草根创新在创新之初，并非是市场导向，而是个人兴趣导向，或解决生活工作中的问题；其次，草根创新经常没有很强的技术支持，因此，很难用传统的知识产权对其进行保护；再次，草根创新具有很强的外部性。

作为世界最大的发展中国家，中国的包容性创新范围更广、对象更丰富。主要包括三个层次：

（1）改善部分社会群体的社会经济福利，包括低收入群体、弱势群体等；

（2）通过提高创新的包容性，解决城乡和区域差异的问题；

（3）带来高效益的同时也蕴藏着极大的风险。

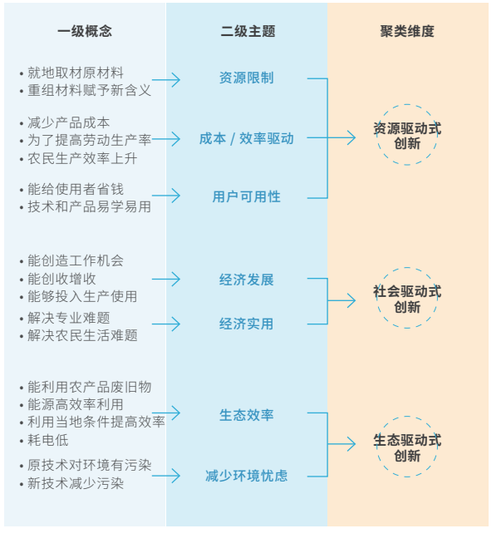
研究方法和数据

经济与合作发展组织 (OECD) 指出，包容性创新是利用科学、技术和创新诀窍以解决低收入群体的需求。它包括两个方面的含义：

农民草根创新案例

序号	产品（技术）名称	发明者	地址
I	温室大棚太阳能取暖器	赵国强	辽宁省建昌县谷杖子乡
II	荸荠采集机	马锁才	江苏省丹阳市新桥镇
III	超级油菜	沈昌健父子	湖南省临澧县杨桥村
IV	程序配量无塔恒压供水装置	冯玉树	四川省南充市新场乡
V	多功能净烟灶	林文忠	云南省巧家县崇溪乡
VI	增强型防水剂	王衡	山西省万荣县光华乡
VII	自行车呼吸机	孟文海等三人	河南省安阳县崔桥乡
VIII	香蕉树粉碎还田机	邓尾	广东省徐闻县锦和镇
IX	无污染秸秆造纸新法	张承绍	山东省岱岳区山口镇
X	桅杆式机械设备组合基础	赵正义	北京市昌平区（原）昌平镇

本文参照 Gioia 和 Corley 在扎根理论基础上提出的质性研究严格归纳法，来分析 10 个典型的中国农民草根创新案例，如表所示。资料来源于所有公开资料包括中国农村创业创新信息网、中国科学技术发展战略研究院、天津财经大学创新与创业研究中心创新数据库、人民网等权威媒体的新闻采访和报道以及 CCTV10 科教频道的相关纪录片。在进行案例选择过程中，采用最大变异抽样法，有意识地选择多样化的案例来获得感兴趣维度的变化，并对各种农民草根创新进行系统抽样，以便于揭示可持续创新的本质。



参照 Gioia 和 Corley 的方法，第一步，与收集到的经验资料进行持续不断的“对话”，来理解农民草根创新的价值创造过程，从资料中获取和发展一级概念，并且必须与资料相适应；第二步，分析一级概念之间的关系，并将概念根据共同的属性组织在一起，形成二级主题，二级主题同样遵循原始资料；第三步，形成三个聚类维度来反映农民草根创新过程中的动态驱动力，如图所示。

研究显示

（1）资源驱动式创新。创新资源是创新主体进行创新活动所依赖的必要资源，包括人力、资金、技术等开展创新活动所必要的资源条件。中国贫富差距大，普遍存在资源分布不平衡的现象。在草根基层，资源的稀缺并没有阻止农民草根群体的创新欲望，反而促使他们通过发明以及赋予日常事物新的功能形成了资源驱动式创新。本文的案例都表明草根农民能充分利用身边的各种材料并赋予新的含义，这也是一种创新能力。

（2）社会驱动式创新。个人和组织，不论性质如何，其生存前提就是为社会提供特定的服务。不同性质的个人和组织置身于社会之中，置身于社会团体之中，必须根据自己在社会中扮演的角色行事。草根创新鼓励解决各种社会问题，如案例中的吃油难题、自来水难题等。

（3）生态驱动式创新。草根农民创造生态友好的产品和技术来产生直接环境收益，或者以最小的能源消耗减少对环境的损害。环境友好常常被摆在专注于创新和技术开发的草根群体活动的中心位置。一方面，环保理念可以为草根创新提供重要思路，环境问题的解决需要创新提供动力源泉，另一方面，草根创新成果对环境的影响具有不确定性，创新水平的高低显著影响生态环境效益。

由此可见，传统观念往往认为创新属于主流社会，只能由大公司、政府、大学等主流部门来进行，但实际上，创新的创意可以来自掌握有价值的传统知识的个人和社区。研究表明，农民“创客”有很强的驱动力来解决一些社会问题，通过设计一些精巧的方法来对当地群众产生影响。在价值创造方面，农民草根创新能够在多个维度方面产生巨大的社会价值，如效率提升，经济增长，解决专业难题等。

此外，传统理念认为商业范式向绿色的转变由世界上的商业精英引领，然而经过研究我们会发现这个转变可以由草根群体的一些多重的、无秩序的、混杂的方法来驱动。“草根科学家”早已经不是一个带嘲笑色彩的词，它成为人们向那些不论起点、坚持创新的民间科研“个体户”投去赞许的目光。

QIN Jialiang
Doctoral Candidate

RESEARCH ON THE SUSTAINABILITY OF GRASSROOTS INNOVATION

——EVIDENCE FROM CHINESE FARMER MAKERS

ZHANG Yuchen
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National prosperity comes from the general public participation in the innovation process that involves the conception, development and popularization of new technologies and new products, which is independent innovation deepgoing in grassroots class. China's Premier Li Keqiang once said that we should let grassroots innovation become a trend and blossom everywhere. As a grounded and creative social movement, grassroots innovation can generate solutions to energy, health, food and other problems, making production and consumption more sustainable.

In the process of poverty eradication, many scholars are immersed in the research of the government and enterprises, while ignoring the power of grassroots innovation. Although there is a lot of research on innovation, there is no real academic research on grassroots innovation. Therefore, we take the typical grassroots group -- Chinese farmers as the research object, and try to understand the value creation process of farmer makers under the condition of resource scarcity through 10 typical cases of Chinese farmers' grassroots innovation, and answer what is the form of grassroots innovation.

Grassroots Innovation and Inclusive Innovation

The Organization for Economic Cooperation and Development (OECD) points out that inclusive innovation is the use of science, technology and innovative know-how to address the needs of lower-income groups. It implies two meanings: (1) to carry out innovative activities aimed at the specific needs of lower-income groups, letting them obtain and enjoy innovative achievements; (2) lower-income groups participate, promote and implement specific innovation activities to play their role and create value in the process of innovation, which is called grassroots innovation.

In order to solve some technical difficulties in production and life, or to reduce the cost of some technologies or products, a series of inventions and innovation activities have been carried out by grassroots groups represented by ordinary farmers with lower income and lower education level, which not only creates economic value, but also brings force socioeconomic benefits. Different from general innovation, grassroots innovation is not market-oriented at the beginning of innovation, but is guided by personal interests or for solving problem in life and work. Secondly, due to lack of strong technical support, it is difficult to protect it with traditional intellectual property rights. Thirdly, grassroots innovation has strong externalities.

As the world's largest developing country, China's inclusive innovation covers a wider range of areas and objects. It mainly includes three levels :(1) improving the socio-economic welfare of some social groups, including low-income groups and vulnerable groups; (2) decrease discrepancy between urban and rural areas and between regions by increasing the inclusiveness of innovation; (3) it brings high benefits but also contains great risks..

Research Method and Data

NO.	Product（Technology）Name	Inventor	Location
I	Greenhouse Solar Heater	ZHAO Guoqiang	Guzhangzi village, Jiangchang county, Liaoning Province
II	Water chestnut harvester	MA Suocai	Xinqiao town, Danyang city, Jiangsu province
III	Super rapeseed	SHEN Jiancai father-and-son	Yangqiao village, Linli county, Hunan province
IV	Towerless program dosing constant-voltage water-supply equipment	FENG Yushu	Xinchang village, Nanchong city, Sichuan province
V	Multifunctional smoke-free oven	LIN Wenzhong	Chongxi village, Qiaojia county, Yunnan province
VI	Enhanced waterproof agent	WANG Heng	Guanghua village, Wanrong county, Shanxi province
VII	Bicycle respirator	MENG Wenhai	Cuiqiao village, Anyang county, Henan province
VIII	Banana tree pulverizer for returning to the field	DENG Wei	Jinhe village, Xuwen county, Guangdong province
IX	Non-pollution straw-paper making method	ZHANG Chengshao	Shankou town, Daiyue district, Shandong province
X	Mast-type mechanical equipment combination foundation	ZHAO Zhengyi	Changping town, Changping (original) district, Beijing

Referring to the rigorous induction method of qualitative research proposed by Gioia and Corley on the basis of grounded theory, this paper analyses 10 typical grassroots innovation cases of Chinese farmers, as shown in table 1. The data sources come from all the public information including China Rural Entrepreneurship and Innovation Information Network, Chinese Academy of Science and Technology for Development, innovation database of Innovation and Entrepreneurship Research Center of Tianjin University of Finance and Economics, news interviews and reports of authoritative media such as People's Daily online and relevant documentaries of CCTV10 science and education channel. In the process of case selection, maximum variation sampling method is adopted to consciously select diversified cases to obtain changes in the dimension of interest, and systematic sampling is carried out on various grassroots innovations of farmers, so as to reveal the essence of sustainable innovation.

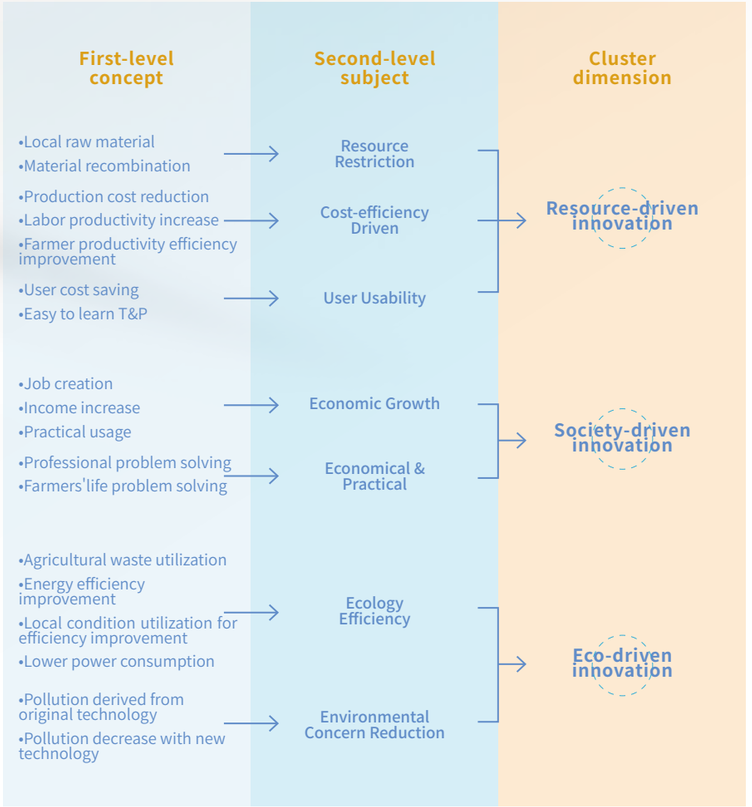
Referring to Gioia and Corley's method, the first step is to have a continuous "dialogue" with the collected empirical data to understand the value creation process of grassroots innovation of farmers, and to obtain and develop first-level concepts from and adapting to the data. The second step is to analyze the relationship between the first-level concepts and organize them together according to common attributes to form a second-level subject which also follows the original data. The third step is to form three clustering dimensions to reflect the dynamic driving force in the process of grassroots innovation of farmers, as shown in figure 1.

Research Reveals:

(1) Resource-driven innovation. Innovation resources are the necessary resources that the innovation subject relies on for innovation activities, including human resources, capital, technology and other necessary resource conditions. Due to the large gap between the rich and the poor, unbalanced distribution of resources is a prevailing phenomenon in China. At the grassroots level, resources scarcity does not prevent farmers from innovation, but urges them to form resource-driven innovation by inventing and adding new functions to daily things. All the cases in this paper show that grassroots farmers can make full use of various materials around them and give these things new meanings, that is also a kind of innovative ability.

(2) Society-driven innovation. Individuals and organizations, regardless of their nature, exist on the premise of providing specific services to the society. Individuals and organizations of different natures must act in accordance with their roles in the society in which they are placed. Grassroots innovation encourages solutions for various social problems, such as the cooking oil and tap water problems in the cases.

(3) Eco-driven innovation. Grassroots farmers create ecologically friendly products and technologies to generate direct environmental benefits or to reduce environmental damage with minimal energy consumption. Environmental friendliness is often at the center of grassroots' activities focused on innovation and technology development. On the one hand, the concept of environmental protection can provide important ideas for grassroots innovation, and innovation is the driving force for solving environmental problems. On the other hand, the impact of grassroots innovation on the environment is uncertain, that the level of innovation significantly affects the ecological and environmental benefits.



This shows that traditional concepts tend to believe that innovation belongs to the mainstream society and can only be carried out by big companies, governments, universities and other mainstream departments. However, in fact, innovative ideas can come from individuals and communities that master valuable traditional knowledge. Our research shows that farmer "makers" have a strong driving force to solve social problems and influence local people by designing ingenious methods. In terms of value creation, grassroots innovation of farmers can generate huge social value in multiple dimensions, such as efficiency improvement, economic growth and professional problem solving.

In addition, it is traditionally believed that the business paradigm transition to green is led by the business elites in this world. However, through research, we found that this transition can be driven by the multiple, disorderly and mixed approaches of grassroots. "Grassroots scientists" is no longer a mocking word, it has become a praise to the "individual" folk researchers who are persist in innovation regardless of the origin point.

考虑采购资金约束的物流服务能力采购决策

近年来，产品服务化和服务外包不断发展，为服务供应链的形成与发展奠定了坚实的基础。随着物流产业在国民经济中地位的提升，物流服务供应链 (logistics service supply chain，LSSC) 的运作效率变得尤为重要。物流服务供应链是以能力合作为核心的服务供应链，它具有物流服务不可存储性、无形性和同步性等特征。

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同济大学经济与管理学院教授、博士生导师

何青
Edison TSE

目前，国内外关于物流服务供应链的研究刚刚起步，其概念尚未形成统一定义。在国内，田宇认为物流服务供应链是以集成物流供应商(或物流服务集成商)为核心，以“集成物流服务供应商的供应商(或功能型物流服务提供商)→集成物流服务供应商(或物流服务集成商)→制造、零售企业”为基本结构，通过提供柔性化的物流服务保证产品供应链的物流运作的新型供应链。

物流服务集成商作为物流服务供应链的核心企业，他通过向不同的专业物流服务供应商采购不同类型的物流服务并进行订单分配和整合，为顾客提供一揽子服务。其具有的物流能力全部或绝大部分来自于外部采购，采购的策略一般有批发价格预订、期权预订以及当需求发生时从现货市场进行采购。资源总是稀缺的。对于限制性因素供应链契约的研究，当前主要集中在交货时间约束和产能约束上。在前人研究的基础上，本研究对 LSSC 中物流服务集成商的采购策略进行研究，分析集成商 3 个决策时期采购资金约束对其采购策略的影响，在第一个决策时期，当存在采购资金约束时，利用 Kuhn—Tucker 条件，讨论了模型解的特征，并讨论对比了各个时期没有采购资金约束和有采购资金约束时模型解的特征。

1．问题描述

考虑单周期二级 LSSC 系统，包括 1 个供应单一物流能力的物流服务提供商 (functional logistics service provider，FLSP) 和 1 个从物流服务提供商订购物流能力并满足最终物流需求的物流服务集成商 (logistics service integrator，LSI)，LSI 本身不具备提供客户物流需求的能力，需要从 FLSP 处订购物流服务能力来满足客户的需求 (如图所示)。

物流服务供应链的结构

集成商的采购决策分为 3 个时期，分别为 t0、t1 和 t2 时刻。在 t0 时刻，LSI 根据对市场需求的预测向 FLSP 提供初始订货量和期权购买量，以供 FLSP 对所订购的需求进行准备；在 t1 时刻，即需求即将发生时刻，LSI 根据对市场信息的观察重新对需求量进行预测，从而确定期权执行量；在 t2 时刻，即需求发生时刻，LSI 根据实际需求确定现货采购量。

2．模型假设与符号说明

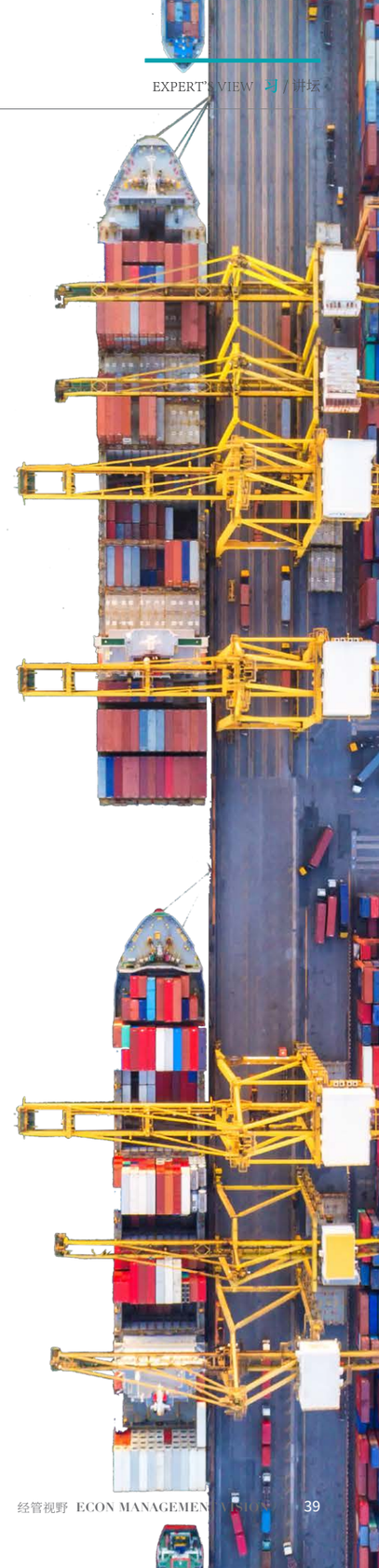
假设 1 物流服务集成商 (LSI) 所面临的物流服务需求是随机的，其价格由市场决定。

假设 2 1 单位的物流服务需求需要 1 单位的物流能力来满足，集成商所需的物流能力全部通过向分包商订购来满足。

假设 3 物流服务集成商 (LSI) 和物流服务提供商 (FLSP) 之间信息对称，且两者均为有限理性和风险中性。

假设 4 LSSC 中物流服务集成商 (LSI) 占主导地位。

假设 5 在物流服务集成商 (LSI) 的采购方式中，批发预订价格小于期权采购价格 (期权预定价格和期权执行价格之和) 小于现货市场采购价格。



3．模型构建与分析

3.1 集成商 t0 时刻的采购决策

（1）无资金约束时

$$q^* = F^{-1}\left(\frac{\omega_0+\omega_e-\omega_1}{\omega_e}\right)$$

$$m_1^* = F^{-1}\left(\frac{\omega_2-\omega_e-\omega_0}{\omega_2-\omega_e}\right)-q^*$$

q: 集成商初始订货量；m_1: 集成商的期权购买量；

ω_0: 单位期权预定价格；ω_e: 单位期权执行价格；

ω_1: 单位物流服务能力批发价格；ω_2: 单位物流服务能力现货采购价格；

（2）有资金约束时

当存在采购资金约束时，集成商第一阶段的决策问题是有约束的非线性规划问题，本文利用 Kuhn-Tucker 条件，对其解的特征进行分析，提出并证明了两个命题。两个命题说明了：第一，无论采购预算资金如何短缺，集成商都不会放弃批发价格采购；第二，当采购预算资金短缺到一定程度时，集成商将放弃期权采购，而将有限的资金全部用于批发价格采购。另外，当集成商的采购资金超过某一数值时，将同时采用初始订购和期权采购两种采购方式，实现采购决策的最优化。

3.2 集成商 t1 时刻的采购决策

LSI 在 t1 时刻的决策主要是对期权执行量 me 的确定，即在需求即将发生时，根据从 t0 到 t1 这段时间对市场需求的掌握对需求量的重新预测，同时考虑初始采购量，确定期权执行量。假设此时基于市场新信息 i 修正后的顾客需求概率密度函数为 f(x/i)，假设市场的其他参数不变，此时，LSI 预测的市场总需求为 q'。

当没有资金约束时，LSI 在此阶段的采购决策为：

$$m_e^* = \min\{[q'- q^*]^+, m_1^*\}$$

3.3 集成商 t2 时刻的采购决策

集成商 t2 时刻的采购决策是指当需求发生时，集成商的初始采购量和期权采购量不满足需求，从而需要在现货市场进行采购一定的物流服务能力来满足需求。

当没有采购资金约束时，集成商会根据市场需求，采购缺少的物流服务能力，此时集成商的现货采购量为

$$m_2^* = \max\{D-q^*-m_e^*,0\}$$

当存在采购资金约束时，集成商会将剩余的采购资金用来采购不足的物流服务能力。

3.4 资金短缺对集成商采购策略的影响

根据前文的分析，提出并证明了下面两个推论。

推论 1 当存在采购资金约束，集成商初始采购量和期权采购量之和比没有采购资金约束时要小。

推论 2 当存在采购资金约束时，集成商将增加初始采购量，减少期权采购量。

4．算例分析

采用数值模拟方法，进一步验证本文所得出的结论。

假设某物流服务集成商，面临的物流服务能力需求满足［0，300］的均匀分布，相应的市场参数分别为 p = 90，ω_1=60，ω_0=10，ω_e=60，ω_2=80，通过数值分析，考察采购资金对集成商决策的影响。

在无资金约束时，根据模型就得，集成商的最优初始采购量 q^* = 50，最优期权采购量 m^*_1 = 100，此时集成商所需的采购预算资金 Y=10000。如果集成商无法筹齐所需的采购资金，即 Y ＜ 10000 时，那么集成商的订货策略将会受到影响，不能按照最优订货策略进行采购。根据当存在采购资金约束时集成商的采购决策问题，考察不同资金约束程度下集成商的采购策略，分析如下：

表 1 不同预算资金下 LSI 的采购策略及利润

采购量	Y/ 千元										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
批发量	0	16	32	50	62	65	62	60	58	56	50
期权预订量	0	0	0	0	4	16	33	49	65	81	100
预订总量	0	16	32	50	66	81	95	109	123	137	150
利润 / 千元	0	480	960	1,500	1,940	2,290	2,550	2,810	3,070	3,330	3,500

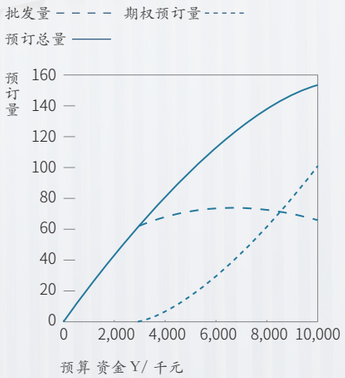


表 2 不同预算资金下 LSI 的采购策略

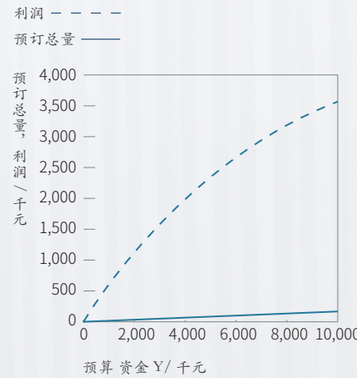


表 3 不同预算资金下 LSI 的采购策略及利润

从表 1 和图 2 可得：

1) 集成商的初始采购量 q 始终大于 0，表明对集成商来说，当存在需求时，初始采购方式是集成商必定会采用的采购方式，这也验证了命题 1 的结论。

2) 随着采购资金的增加，集成商的总采购量 q+m1 也随之增加，直至采购资金为 10000 时，达到最大值 150，这也正是没有采购资金约束时的最优的总采购量，这也验证了推论 1 的结论。

3) 资金短缺程度越高，集成商越会增加初始采购量的比例，减少现货采购量的比例，即 Y 越小，q 所占采购量比例越大，m1 所占采购量比例越小，当资金短缺到一定程度时，集成商将只会采用初始采购，这也验证了推论 2 的结论。

从表 1 和图 3 可得，随着采购资金的增加，LSI 可能的利润大致上是逐渐增加的。因为此处的利润是按照市场需求等于批发价格采购与期权预定量之和计算出的大致利润，但具体的利润情况还需要结合后续信息更新情况以及市场的实际情况进行精确的计算。

5．结束语

研究发现在有资金约束条件下，集成商初始采购量和期权采购量之和比没有采购资金约束时要少；同时，存在采购资金约束时，集成商将增加初始采购，减少期权采购。存在采购资金约束时，LSI 在第二阶段的期权执行量和第三阶段的现货采购量也不仅仅会受到需求的影响，也会受到采购资金的影响。

In the resent years, product service and service outsourcing have been developing, proving a solid basis for the formation and development of the service supply chain. Since the logistics industry has been gaining more importance in the national economy, the operational efficiency of Logistics Service Supply Chain (LSSC) becomes particularly important. LSSC is a service supply chain that sees capacity cooperation as core, and its characteristics include non-storage, intangibility and synchronization of logistics services.

PROCUREMENT DECISIONS CONSIDERING LOGISTICS SERVICE CAPABILITY UNDER CAPITAL CONSTRAINTS

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HE Qing
Edison TSE

So far, there is no universal definition of LSSC since relevant researches both at home and abroad have just started. Tian Yu, a Chinese researcher, believes that LSSC is a new supply chain centering on integrated logistics service provider (or logistics service integrator) that guarantees logistics operation in the product supply chain by providing flexible logistics services. Its basic structure is "Integrated logistics service provider's supplier (or functional logistics service suppliers) →Integrated logistics service provider (or logistics service integrator) →Manufacturing and retail enterprises".

As core enterprises of the logistics service supply chain, logistics service integrators provide package services to clients through purchasing different types of logistics services from different professional logistics service providers, and distributing and integrating orders. All or most of its logistics capabilities come from external procurement of which the purchasing strategies include wholesale price bookings, option bookings, and purchases from spot markets when demand arises. However, resources are always scarce and the current studies on supply chain contracts with restrictions mainly focus on constraints on delivery time and capacity. Based on the previous studies, this research enquires on procurement strategies of logistics service integrators in LSSC and analyses the impact of the capital constraint on procurement strategies of integrators during the 3 decision-making stages. Moreover, concerning the first decision-making stage, this research, using the Kuhn-Tucker condition, discusses the characteristics of the model solution, analyses and compares its characteristics in different stages with and without the capital constraints.

1. Problem Description

A single-cycle secondary LSSC system is composed of one functional logistics service provider (FLSP) with the capability to supply single logistics and one logistics service integrator (LSI) with the capability to order logistics service from FLSP and to meet the final logistics need. LSI itself does not possess the ability to provide customers with logistics services and thus needs to order logistics service from FLSP (see Diagram 1).

Diagram 1 Structure of a Logistics Service Supply Chain

The integrator's procurement decisions can be divided into 3 stages, namely, t0, t1 and t2. At t0, LSI provides the initial order volume and option purchasing volume to FLSP for it to prepare in advance. At t1, the stage right before the demand occurs, LSI re-predict the demand according to market information and determines the volume of options that is going to be exercised. At t2, the stage where the demand occurs, LSI provides the volume for spot purchase base upon actual demand.

2. Model Hypothesis and Symbol Description

Hypothesis 1 The logistics service need LSI faced with is random and its price is determined by the market.

Hypothesis 2 1 unit of logistics service demand requires 1 unit of logistics capacity. The logistics capacity need of integrators is met by the subcontractors.

Hypothesis 3 The information between LSI and FLSP is symmetrical and both are with bounded rationality and neutral risks.

Hypothesis 4 LSI holds a dominant position in LSSC.

Hypothesis 5 When it comes to the procurement methods of LSI, the wholesale booking price is less than option purchasing price (option booking price plus the option execution price), and less than the spot market purchasing price.

3. Construction and Analysis of the Model

3.1 LSI's Purchase Decision at t0

Without capital constraint

$$q^* = F^{-1}\left(\frac{\omega_0+\omega_e-\omega_1}{\omega_e}\right)$$

$$m_1^* = F^{-1}\left(\frac{\omega_2-\omega_e-\omega_0}{\omega_2-\omega_e}\right)-q^*$$

q: LSI's initial order volume; m_1: LSI's option purchase volume;
ω_0: Option booking price per unit;
ω_e: Option execution price per unit;
ω_1: Wholesale price for logistics service capacity per unit;
ω_2: Spot sourcing price for logistics service capacity per unit.

With capital constraint

With capital constraint, the decision-making problem of integrators at this stage is a constrained nonlinear programing problem. This research employs the Kuhn-Tucker condition to analyze the characteristics of its solution, and two propositions are proposed and proved. The two propositions imply that: Firstly, regardless of the procurement budget shortage, integrators will never give up purchases at wholesale prices. Secondly, when the budget shortage reaches a certain point, integrators will give up the purchase of options and use their limited funds for wholesale price procurement. In addition, when the integrator's purchase capital exceeds a certain value, both the initial order and option purchase will be used to optimize the purchase decision.

3.2 LSI's Purchase Decision at t1

At stage t1, LSI's decision is mainly to determine the option execution quantity me, that is, when the demand is about to take place, integrator will re-predict its demand according to the information about market demand between t0 and t1. At the same time, integrators have to determine the option execution quantity based on the initial purchase quantity. If the probability density function of customer demand modified based on new market information i is f(x/i), and other parameters of the market remains the same, the total market demand predicted by LSI is q'.

When without capital constraint, LSI's purchasing decision at this stage is:

$$m_e^* = \min\{[q'- q^*]^+, m_1^*\}$$

3.3 LSI's Purchase Decision at t2

Integrators have to make a purchasing decision at this stage because, when the demand occurs, their initial purchasing volume and option purchasing volume no longer meet their needs, thus they need to purchase a certain volume of logistics service capacity from the spot market.

When without capital constraints, integrators will purchase the volume of logistics service capacity that they need additionally according to the market demand. The spot purchasing volume at this stage is:

$$m_2^* = \max\{D-q^*-m_e^*,0\}$$

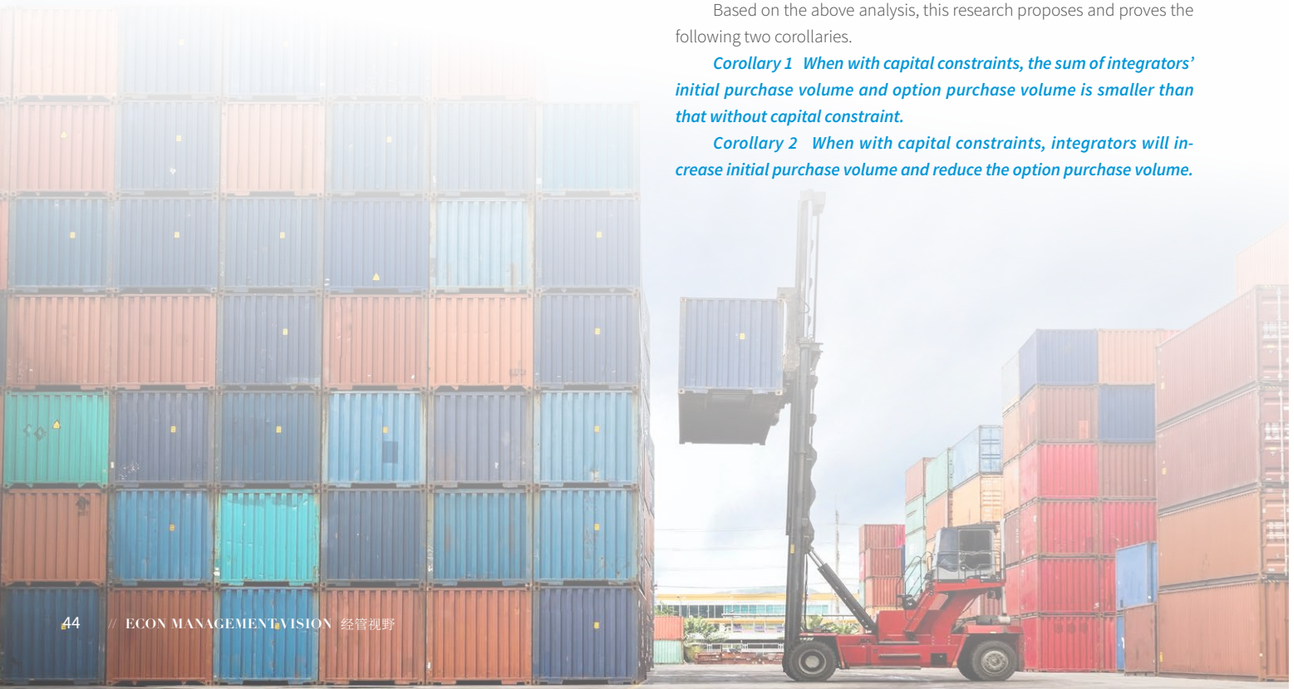
When with capital constraints, integrators will use surplus funds to purchase the volume of logistics service capacity that they fall short of.

3.4 Influence of Capital Constraint on LSI's Purchase Decision-making

Based on the above analysis, this research proposes and proves the following two corollaries.

Corollary 1 When with capital constraints, the sum of integrators' initial purchase volume and option purchase volume is smaller than that without capital constraint.

Corollary 2 When with capital constraints, integrators will increase initial purchase volume and reduce the option purchase volume.



4. Case Analysis

This research will employ the numerical simulation method to further verify the proposed conclusions.

Assuming that a logistics service integrator is faced with a uniform distribution of logistics service demand [0, 300], the corresponding market parameters are p = 90, ohm 1=60, ohm 0 =10, ohm e =60, ohm 2 =80. Numerical analysis will be employed to examine the impact of procurement funds on LSI's decision-making.

When there is no capital constraint, according to the model, the integrator's optimal initial purchase volume q*=50 and its optimal option purchase quantity m*1 =100, and the required purchase budget Y=10000. If the integrator fails to raise the required procurement budget, that is, Y< 10000, then its ordering strategy will be affected and the optimal ordering strategy can no longer be applied. This research then enquires on the purchase strategies under different level of capital constraints according to the purchase decision problem when there is a capital constraint. The analysis is as follows:

Purchase Volume	Y/1000RMB										
	0	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Wholesale Volume	0	16	32	50	62	65	62	60	58	56	50
Option Ordering Volume	0	0	0	0	4	16	33	49	65	81	100
Total Ordering Volume	0	16	32	50	66	81	95	109	123	137	150
Profit/1000RMB	0	480	960	1,500	1,940	2,290	2,550	2,810	3,070	3,330	3,500

Table 1 LSI's Purchasing Strategy and Profit with Different Budget Funds

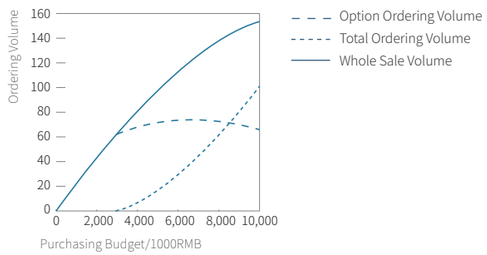


Diagram 2 LSI's Purchase Strategy with Different Budget Funds

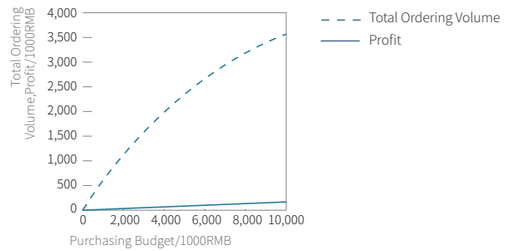


Diagram 3 LSI's Purchase Strategy and Profit with Different Budget Funds

What we can conclude from Table 1 and Diagram 2:

1 The integrator's initial purchase volume q is always greater than 0, indicating that, when there is a demand, the initial purchase method is the purchase method that integrators are bound to adopt, which also verifies the conclusion of proposition 1.

2 With the increase of purchase funds, the integrator's total purchase volume q + m1 also increases, until it reaches a maximum of 150 when the purchase fund is 10000, which is the optimal total purchase volume when without capital constraints. This conclusion verifies Corollary 1.

3 The higher the degree of capital shortage, the more the integrator will increase the proportion of initial purchase volume and reduce that of spot purchase volume. That is to say, the smaller the Y, the larger the proportion of q in the total purchase volume, and the smaller the proportion of m1 in the total purchase volume. When the capital shortage reaches a certain level, the integrator will only use initial purchase, which verifies Corollary 2.

What we can conclude from Table 1 and Diagram 3 is that, as the purchasing funds increase, the possible profit of LSI is generally increasing. The profit indicated here is an approximate profit calculated with the assumption that the market demand equals to the sum of the wholesale purchase volume and option ordering volume. However, the specific profit needs to be accurately calculated in combination with the subsequent information update and actual situation of the market.

5. Conclusion

This research has revealed that, under capital constraints, the sum of integrators' initial purchase volume and option purchase volume is smaller than that when without capital constraints. Moreover, when with capital constraints, integrators will increase initial purchase volume and reduce option purchase volume. In the case of constraint of purchase funds, LSI's option execution volume at stage 2 and its spot purchase volume at stage 3 are not only influenced by demand, but also affected by purchase funds.

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改革开放 40 周年
科技创新促未来

主办方
中国科学学与科技政策研究会

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新技术变革中的新制度的思考

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中国科学学与科技政策研究会名誉理事长

改革开放 40 年来中国取得了巨大的进步，面对过去的成绩，我们既不能盲目自大，也不能妄自菲薄。回顾这 40 年的科技体制改革，其基本问题没有变，但是内涵和解决方案却发生了变化。

在新技术变革中安排和设计新的制度问题时，一要坚持科学技术的问题导向，突出原始创新；二是政府要完善投资机制；三是完善用人制度；四是高度关注科技伦理。新技术的发展实际上是向制度提出了一个全新的挑战。当中国走向世界科学的前列时，需要自己开辟新的方向、新的领域，要把科学家自己的追求和国家发展中的真实问题紧密结合；也迫切需要高度关注科技伦理，承担起相应的社会责任。

在未来，科技成果转化是一个发展重头。近年来国家修订了成果转化法，今年还会修订专利法，要打通产业链和创业链，我们不仅需要技术，也需要建立庞大的产业。

中国创新发展回顾与展望

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改革开放 40 年，中国的发展深刻地改变了全球竞争基本格局，体现为与发展中国家的“竞争合作”关系向“互补合作”关系转变，以及与发达国家的“互补合作”关系向“竞争合作”关系转变。

现在看创新发展政策，我们可以观察到科学、技术、产业、环境、贸易的发展政策，所以现在讲的创新发展政策应该是这些政策的协调整合，不是从一个点上看局部发展，而是系统地看发展。这是从创新政策向创新发展政策拓展的基本思想。

创新驱动数字转型发展政策展望：大国崛起需要以社会价值观转变为支撑，要摒弃“自我为中心的单边利益最大化”的价值观，以“平等、合作、互惠、共赢”的价值观拓展发展空间，从“注重吸纳利用全球创新要素”向“注重为全球创新者提供服务”转变。

中国企业创新 40 年发展

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40 年改革开放不同阶段特点：

1978-1988：努力学习，克服短缺。

1989-1998：引进消化，完善提高。

1999-2008：加快探索，奋起追赶。

2009-2018：加速创新，实现突破。

随着产业升级的紧迫性增大和高端竞争加剧，企业创新由“合作和跟随创新”向“自主和领导创新”转变。企业开始关注内部创新能力体系和外部创新生态构建，新的商业模式快速涌现，一些新业态引领世界。未来十年企业创新的重点应当从依赖满足外向经济需求转向扩大本土消费，催生新的产业。在新技术领域持续突破同时，加速绿色创新、包容创新和国际合作方式创新，形成全面创新的态势。结合中国转型阶段、文化特征和特殊政企关系，构建具有竞争优势且难以被模仿的创新生态。

数字技术对于创业活动影响研究回顾与展望

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新技术、数字技术现在全方位地影响我们经济、社会、生活的各个方面，而这些影响都离不开对机会、资源的识别、整合和利用的过程。

数字技术对企业创业活动既有正面影响，数字技术的开放性、关联性和可扩展性能提高创业配用资源的效率，通过促进资源的不断整合及新机会的出现促使创业生态系统的可持续性发展。它同时也对企业创业活动有着负面影响，数字技术的可编辑性和开放性在一定程度上为创业企业的生存带来威胁，在某种程度上阻碍了创业企业资源的获取和资源配用效率的提高。数字技术对创业理论的挑战主要在六个方面，资源基础观、动态能力、制度理论、网络理论、机会发现观、机会制造观。

未来的研究，不仅仅是机会获得资源，而应该是从一体化整合、跨层面和动态的视角来研究数字技术对创业活动的影响。

探究经济增长创新驱动的内在机制——基于新熊彼特增长理论的角度

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我们国家处于从要素驱动、投资驱动向创新驱动转型的阶段，中国的经济增长之迷很难用新古典领域给予一个解读，将新古典与新熊彼特以及管理学的最新发展进行融合，以解释一个国家的经济增长。

通过双向固定效益模型，得出以下结果：第一，风险投资、产业的多样性、地方产业的集聚度对经济增长有很大的正向作用，知识生产人员的异质性、企业对高校、研究机构的研发投入对地区经济增长率有抑制作用。第二，大量创新思想还是融入到国际化和人才流动，中国内生经济增长的驱动还是比较有限。第三，要素的多元化、异质性、集聚性、开放性是地方经济增长最重要的影响因素。

研究启示：企业的建立和发展需要一个开放的流动性生态系统，但同时也需要一定的文化背景认同降低因人口过于多元化导致的“知识隔离”。我国的创新驱动发展需要各个地区积极促进区域知识生产各要素和部门的有效联动和互动协作，增加区域产业多元化和抑制性发展，外地包容性与本地文化保护并行，同时也要注重提升知识创新成果转化效率。要素的多元性、异质性、集聚性、开放性，可以促进一个地区的经济增长。

科技创新政策 40 年的回归与反思

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全国科技大会，制定了面向依靠方针，开启了科学的春天。

改革成功之处：在创新系统改革和加强研发投入方面取得了巨大的进步；中国的研发投入已经领先发展中国家；在航天领域，高性能计算机，新能源，纳米材料等领域取得重要进展；中国的高校和研究机构的研究能力和效率大大提高，在很多重要的研究领域中已经成为全球创新系统的重要力量。改革成功的原因是改革与开放形成了良性互动，国内改革和国际融合形成了非常好的良性循环。

改革的不足之处：产业创新能力差距明显。主要表现在中国整体产业创新能力不足，劳动生产率不高；自主创新能力不足，技术依赖比较严重；产品质量无法满足需求，知名品牌缺乏等方面。其原因在于中国的国家创新体系改革有待深化；中国的市场改革尚未完成；创新能力积累的客观规律一需要时间。

科技创新政策面临很多新的挑战，需要进一步研究以下几个重大问题：科技和经济关系的问题，包括科技的贡献率、国家创新体系与创新主体的定位等问题；自主创新与开放创新的问题；“举国体制”与市场模式；网络 / 数字经济的创新规律；全球化下的科技治理。

国家科技创新政策实践与思考

贺德方 研究员
科技部政策法规与监督司司长

在 40 年的改革开放历程中，科技体制改革始终走在各项改革工作的前列，且始终围绕两条主线在进行，一条是科研人员的积极性，另外一条是科技和经济的结合。

以政策实践者的角度来看 40 年科技创新政策的进展和重点政策，第一，围绕创新链，持续加大创新要素投入和优化布局；第二，建立覆盖企业全生命周期的企业创新政策体系；第三，完善促进科技成果转移转化的制度体系；第四，因产施策；第五，坚持重点突破、协同推进，不断优化区域创新布局；第六，建立立体化知识产权保护体系；第七，坚持全球视野；第八，建立贯穿科研活动全流程的监督和评估体系。

对政策方向的思考：改革完善政策，政策要优化体系，体系要支撑发展。

对政策研究工作的建议：面向未来亟待加强科技创新政策研究，要加强科技创新政策理论体系、政策数据基础、科技创新政策研究人才队伍的建设、专业分析方法和工具的开发。

人工智能城市原型架构

吴志强
中国工程院院士、同济大学副校长

城市是有生命发展规律的，要学会尊重规律，按照城市发展规律来做，以社会行为的智能化推动可持续的城镇化。智能城市有四大特征，即全面感知、准确判断、恰当反应、最小消耗。在智能城市建设中，信息的重新组织能够突破空间距离、提升组织效率、替代实体形态，因而，有序地推进智能城市建设也为解决城镇化和工业化过程中存在着各种问题提供了前所未有的机遇。

智慧城市的实际应用：

2008 年，都江堰市总体城市设计。
2010 年，上海世界博览会园区总体规划。
2012 年，智能市长桌。
2014 年，CBDB，“城市树”（中国工程院国际知识中心课题）
2018 年，人工智能城市原型：世界人工智能第一小镇。

FOUR DECADES OF REFORM AND OPENING-UP: *S&T INNOVATION FOR A BRILLIANT FUTURE*

Thoughts on the new system under the new revolution of technology

FANG Xin Professor
Honorary Chairman of Chinese Association for Science of Science and S&T Policy

Thoughts on the new system under the new revolution of technology

In the face of the tremendous progress China has made in the past 4 decades of reform and opening-up, we should neither be conceited nor humble. When reviewing the reform of the S&T system during the past 40 years, the basic problems remained unchanged, but the meaning and solutions have changed.

There are 4 principles we must stick to in the arrangement and design of new institutional problems concerning the reform of the S&T system. First, we must hold on to the problem orientation of science and technology and highlight original innovation. Second, the government should improve the investment mechanism. Third, the employment system needs to be improved. Fourth, special attention shall be paid to the S&T ethics. The development of new technologies is indeed a brand-new challenge to our system. As China enters the forefront of science in the world, it needs to open up new directions and fields. Scientists' should closely integrate personal pursuit with the real problems of national development, and to attach great importance to the ethics of science and technology and assume the corresponding social responsibility.

Looking forward, the transformation of scientific and technological achievements is a major task. Recently, China has amended the law of promoting the transformation of scientific and technological achievements. The patent law will also be amended this year. In order to connect the industry chain with the entrepreneurial chain, we need not only technology, but also build a huge industry.

Chairman of Chinese Association for Science of Science and S&T Policy, Dean of the School of Public Policy and Management, University of Chinese Academy of Sciences

40 years since the Reform and Opening-up, China's development has profoundly changed the basic pattern of global competition, reflected in the shift from "competition and cooperation" with developing countries to "complementary cooperation" and from "complementary cooperation" to "competition and cooperation" with developed countries.

MU Rongping Researcher
Honorary Chairman of Chinese Association for Science of Science and S&T Policy

Development of Innovation in China: Retrospect and Prospect

We can observe the development policies of science, technology, industry, environment and trade when we look at innovative development policies. Therefore, the policy of innovative development should be the coordination and integration of these policies. This is the basic idea that extends from innovation policy to innovation development policy.

An outlook of the development policy of innovation-driven digital transformation: The rise of a great power needs to be supported by the transformation of social values, which is to discard the value of "self-centered unilateral profit maximization", and to expand the space of development with the values of "equality, cooperation, mutual benefit and win-win", and to shift from "focusing on absorbing and utilizing global innovation elements" to "focusing on providing services for global innovators".

LI Yuan Professor
Vice Chairman of Chinese Association for Science of Science and S&T Policy, Dean of Tongji SEM

Innovation and Development of Chinese Enterprises in the Past 40 Years

Characteristics of different stages of Reform and Opening-up in the past 40 years:

1978-1988: Study hard to overcome the shortage

1989-1998: Introduce and digest to improve

1999-2008: Accelerate exploration and catch up

2009-2018: Expedite innovation and achieve breakthroughs

With the increasing urgency of industrial upgrading and the intensification of high-end competition, enterprise innovation has shifted from "innovation through cooperation and imitation" to "independent and leading innovation". Enterprises began to pay attention to the internal innovation capability system and the construction of external innovation ecology. New business models emerged rapidly and some new forms of industry have become world-leading. In the next decade, the focus of enterprise innovation should shift from relying on meeting the needs of outward economy to expanding domestic consumption and generating new industries. While continuing to make breakthroughs in new technologies, we will accelerate green innovation, inclusive innovation and innovation in ways of international cooperation to create a momentum of comprehensive innovation. In combination with China's transformation stage, cultural characteristics and special government-enterprise relationship, we should build an innovation ecology with competitive advantages that is difficult to be imitated.

CAI Li Professor
Vice Chairman of Chinese Association for Science of Science and S&T Policy, Jilin University

Research on the Impact of Digital Technology on Entrepreneurial Activities: Retrospect and Prospect

The comprehensive influence of new technologies, especially digital technology, on all aspects of our economy, society and life is inseparable from the process of identification, integration and utilization of opportunities and resources.

Digital technology has a positive impact on entrepreneurial activities. Its openness, relevance and extendibility can improve the efficiency of entrepreneurial resource allocation, and promote the sustainable development of entrepreneurial ecosystem by promoting the continuous integration of resources and the emergence of new opportunities. At the same time, it also has a negative impact on entrepreneurial activities. Its editability and openness, to some extent, pose a threat to the survival of entrepreneurial enterprises, and can, in a way, impede the acquisition and allocation efficiency of resources. The challenge of digital technology to entrepreneurship theory mainly lies in six aspects: resource-based view, dynamic capability, institutional theory, network theory, opportunity discovery view and concept of opportunity creation.

Future research will not focus on acquiring resources, but on digital technology's influences on entrepreneurial activities from an integrated, cross-level and dynamic perspective.

Our country is currently in a transitional stage from factor and investment-driven development to innovation-driven development. Since it is difficult to interpret the mystery of China's economic growth solely from the perspective of Neoclassicism, we will attempt an explanation of this country's economic growth through the integration of Neoclassicism, New Schumpeter and the latest development of management theories.

According to the two-way fixed benefit model, we have found that: First, venture capital, industrial diversity, and local industrial agglomeration have a great positive effect on economic growth. The heterogeneity of knowledge production personnel and the R&D investment of enterprises on universities and research institutions have an inhibitory effect on regional economic growth rate. Second, a large number of innovative ideas are still integrated into internationalization and talent flow, and the driving force of China's endogenous economic growth is still relatively limited. Third, the diversification, heterogeneity, aggregation and openness of relevant factors are the most significant drivers of regional economic growth.

Research implications: the establishment and development of an enterprise require not only an open and mobile ecosystem, but also a certain degree of cultural identity to reduce the "knowledge isolation" caused by over-diversified population. China's innovation-driven development requires that different regions actively promote the effective linkage and interaction and collaboration of various factors and departments of regional knowledge production, increase the diversification and inhibiting development of regional industries, and ensure that out-of-town inclusiveness and local cultural protection go hand in hand. Moreover, it also needs a constructive and effective cooperation of various factors and apartments, an increase of diversified and restraint development of regional industries, parallel measures in including immigrants and protecting local culture, improvement of the transformation efficiency of results from knowledge innovation. The diversification, heterogeneity, aggregation and openness of factors can lead to economic growth in a region.

LIU Xielin Professor
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Exploring the Internal Mechanism of Innovation-driven Economic Development: From the Perspective of New Schumpeter's Growth Theory

XUE Lan Professor
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Dean of School of Public Policy & Management of Tsinghua University

S&T Innovation Policies in Past 40 Years: Retrospect and Reflection

The National S&T Conference has formulated the "Face and Rely on" policy, which boosted the development of science.

Success of Reform: Great progress has been made in the reform of innovation system and in the reinforcement of R&D; China's R&D investment has taken the lead among developing countries; important progress has been made in aerospace, high-performance computers, new energy and nanomaterials; Chinese universities and research institutions have greatly improved their research capacity and efficiency, and have become an important force in the global innovation system in many research areas. The reason for the success of reform lies in the formation of a benign interaction between reform and opening-up, a virtuous cycle in domestic reform and international integration.

The deficiency in reform: China's industrial innovation ability is visibly inadequate. The incompetency mainly lies in: scarce capacity in innovation of the whole Chinese industry, causing low labor productivity; ability deficiency in independent innovation, featuring high technological dependence; product quality falling short of demands, with few well-known brands. Reasons are: China's national innovation system reform still needs to be deepened; China's market reform is not yet complete; it takes time—the objective law of accumulation of innovation abilities.

Policies of S&T innovation are facing numerous new challenges and further research should be done in the following areas: The relationship between S&T and economy, including the contribution rate of technology, national innovation system and the positioning of innovative subject; The problem of independent innovation and open innovation; "The whole nation system" and the market model; Innovation law of network/digital economy; governance of S&T in the process of globalization.

WU Zhiqiang
Academician of Chinese Academy of Engineering,
Vice president of Tongji University

Prototype Architecture of AI City

Every city has its law of life development that is why we need to respect and follow the law of city development, promoting sustainable urbanization with the intelligentization of social behaviors. There are four characteristics of an AI city: comprehensive perception, accurate decision, appropriate response and minimal consumption. In the construction of an AI city, the reorganization of information can break through the spatial distance, improve organizational efficiency and replace entity form. Therefore, the construction of AI cities also provides unprecedented opportunities to solve various problems in the process of urbanization and industrialization.

Real-life cases of smart cities:

2008: Overall urban design of Dujiangyan city

2010: Overall planning of Shanghai World Expo Park

2012: Smart desk of Mayors

2014: CBDB, "City Tree" (a project of the international knowledge center of Chinese Academy of Engineering)

2018: AI city prototype: the first AI town in the world

In the 40 years of reform and opening-up, S&T system has always been at the forefront of reforms, and has always been carried out in accordance with the two main lines: one is the enthusiasm of researchers; the other is the combination of S&T and economy.

From the perspective of policy practitioners, the progress and key policies of S&T innovation policies in the past 40 years are: First, the investment in innovation elements and the optimization of layout should be continuously

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National Policies for S&T Innovation: Practice and Reflection

enhanced centering on the innovation chain; Second, form an innovation policy system for enterprises that covers its entire life cycle; Third, improve the institutional system that promotes the transformation and transfer of S&T achievements; Fourth, make different policies for different industries; Fifth, continue to make breakthroughs in key areas and promote synergy, and constantly optimize the layout of regional innovation. Sixth, establish a three-dimensional protection system of intellectual properties. Seventh, adhere to a global vision. Eighth, forming a monitoring and evaluation system for that covers the entire process of research activities.

Thinking about the policy direction: Reform and improve the policy. Policies should optimize the system, and the system should support the development.

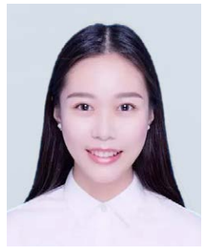
Suggestions for policy research: it is urgent to strengthen policy research on S&T innovation, the theoretical system of policy on S&T innovation, the policy data basis, the construction of talent team for policy research on S&T innovation and the development of professional analysis methods and tools.

企业住房公积金缴费的所有制差距

——基于时间和空间的二维分析

（摘自《公共管理与政策评论》）

郭磊
同济大学经济与管理学院副教授



许玲玲
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制度背景

1991 年，上海市率先在我国推出住房公积金制度。1994 年，《国务院关于深化城镇住房制度改革的决定》要求全面推行住房公积金制度，并确定了沿袭至今的基本制度框架：企业和职工分别按照职工工资总额、个人工资的一定比例按月缴纳，比例“掌握在 5%，已超过这个比例的可以不变”。2015 年，住房城乡建设部组织起草了《住房公积金管理条例》（修订送审稿），报国务院审议，拟设定缴存比例上限 12% 和下限 5%，但至今尚未审议通过。2016 年，住房城乡建设部、发展改革委、财政部和人民银行联合下发《关于规范和阶段性适当降低住房公积金缴存比例的通知》，明确设置缴存比例上限为 12%，超过的一律按规范调整。

人们直观地认为国有企业比非国有企业缴纳更多的住房公积金，企业职工薪酬存在显著的所有制差距。已有文献证明国有企业的工资、社会保险缴费、企业年金参保及缴费和住房公积金缴存人数等高于非国有企业，但在住房公积金缴费率方面还缺少直接证据。

本文考察所有制对企业住房公积金实际缴费率的影响。以 2008—2015 年 A 股上市公司为样本，包括 3024 家公司共计 10871 个观测值。被解释变量为企业住房公积金实际缴费率，即本年度企业住房公积金缴费金额占上年度职工工资总额比重。主解释变量为所有制，依实际控制人性质划分国有企业和非国有企业。控制地方政策和企业特征等 12 个影响因素。

首先考察时间维度。数据显示，2008—2015 年，国有企业的平均住房公积金实际缴费率是非国有企业的 1.86 倍（2008 年）至 2.23 倍（2009 年），中位数则是非国有企业的 2.20 倍（2010 年）至 2.59 倍（2013 年），所有制差距长期存在但没有明显的时间趋势。回归结果显示，国有企业的住房公积金实际缴费率长期超过非国有企业 2 个百分点。分位数回归结果显示，所有制差距在 10%、50% 和 90% 分位的缴费率水平上均存在，呈现两端高中间低的趋势。

Oaxaca-Blinder 分解结果显示，所有制差距中可解释部分始终低于不可解释部分，但从 2008 年的 18.86% 逐年上升至 2015 年的 36.56%。

其次考察空间维度。数据显示，2008—2015 年，东部、中部和西部地区国有企业的平均住房公积金实际缴费率分别是非国有企业的 1.65 倍（2015 年）至 1.93 倍（2008 年）、1.68 倍（2014 年）至 1.89 倍（2008 年）、1.64 倍（2010 年）至 1.89 倍（2008 年），所有制差距长期存在但没有明显的时间趋势。回归结果显示，东、中、西部地区国有企业的住房公积金实际缴费率长期超过非国有企业 2、3 和 3 个百分点。分位数回归结果显示，东、中、西部地区所有制差距在 10%、50% 和 90% 分位的缴费率水平上均存在，呈现两端高中间低的趋势。OaxacaBlinder 分解结果显示，东、中、西部地区所有制差距中可解释部分始终低于不可解释部分，其中东部地区可解释部分占比最多为 39.11%，中部地区占比最少为 17.83%。

本文主要有两点贡献：(1) 直接检验所有制对企业住房公积金实际缴费率的影响，将企业职工薪酬的所有制差距研究从工资、社会保险、企业年金等项目拓展至住房公积金。(2) 从时间和空间两个维度考察企业住房公积金所有制差距的变化，将企业住房公积金缴费行为研究从静态深入到动态层面。以上研究为预测和干预企业住房公积金缴费提供了理论依据。

结论与讨论

结果表明：

(1) 企业住房公积金缴费差异中的市场形成机制逐步增强。近年来，我国社会主义市场经济体制不断完善，市场机制对企业微观决策的影响不断增强。本文实证研究发现，2008—2015 年，国有企业与非国有企业的住房公积金缴费差距并没有扩大，且可解释部分逐年提高。同时，从地域上看东部地区市场机制更完善，所有制差距最小且可解释部分比重最高。时空两个维度结果均表明，企业住房公积金缴费差异中的市场形成机制逐步增强。

(2) 国有企业在住房公积金合规中起到双向作用。分位数回归结果显示，所有制差距在高缴费率和低缴费率的企业中更为明显。对低缴费率企业而言，国有企业缴费率更高，意味着企业合规程度更高，政策得到贯彻，职工权益得到保护，国有企业发挥了政策工具的作用。对高缴费率企业而言，国有企业缴费率更高，意味着企业过度合规，职工权益不平等，国有企业起到了拉大收入差距的作用。

历年东、中、西部地区企业住房公积金实际缴费率

年份	东部			中部			西部		
	国有	非国有	差距	国有	非国有	差距	国有	非国有	差距
2008	8.35%	4.32%	1.93	8.33%	4.41%	1.89	9.06%	4.80%	1.89
2009	8.19%	4.38%	1.87	8.24%	4.63%	1.78	8.97%	5.16%	1.74
2010	8.14%	4.44%	1.83	8.19%	4.74%	1.73	8.94%	5.45%	1.64
2011	7.88%	4.49%	1.76	8.05%	4.71%	1.71	8.85%	5.33%	1.66
2012	7.79%	4.48%	1.74	8.00%	4.57%	1.75	8.78%	5.08%	1.73
2013	7.66%	4.46%	1.72	7.95%	4.63%	1.72	8.78%	5.20%	1.69
2014	7.46%	4.50%	1.66	7.87%	4.68%	1.68	8.67%	5.10%	1.70
2015	7.43%	4.49%	1.65	7.86%	4.52%	1.74	8.64%	4.94%	1.75

注：差距 = 国有 / 非国有，单位无，保留小数点后两位。

A TIME-SPACE ANALYSIS ON THE OWNERSHIP GAP OF FIRMS' CONTRIBUTIONS TO HOUSING PROVIDENT FUND

Digested from Public Administration and Policy Review

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XU Lingling
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SYSTEM BACKGROUND:

In 1991, Shanghai took the lead in launching the Housing Provident Fund (HPF) System in China. In 1994, the Decision of the State Council on Deepening the Reform of the Urban Housing System demanded the full implementation of the Housing Provident Fund System, and established the fundamental institutional framework of today: enterprise and employees respectively make monthly contributions according to certain proportion of total employee wages and personal wages. The proportion is "set as 5%, and the actual proportions that have exceeded the limit could remain unchanged". In 2015, the Ministry of Housing and Urban-Rural Development drafted the Regulations on Management of Housing Provident Fund (Revised Draft for Review) and submitted to the State Council for approval. It planned to set a ceiling payment proportion of 12% and a lower limit of 5%; however it hadn't been passed till now. In 2016, the Ministry of Housing and Urban-Rural Development, National Development and Reform Commission, Ministry of Finance and the People's Bank of China jointly issued the Notice on Standardization and Periodical Proper Reduction of the Housing Provident Fund Deposit Ratio, which clearly sets the upper limit of deposit ratio as 12%, and the excessive part should be adjusted according to standards.

People intuitively take the view that state-owned enterprises pay more housing provident fund than non-state-owned enterprises, and there is a significant ownership gap in employees' compensation. Published literature has proved that the employee wages, social insurance payment, enterprises annuities participation and contribution, and the number of people paying housing provident fund at state-owned enterprises are higher than those in non-state-owned enterprises; however, there is no direct evidence on the contribution rate of housing provident fund.

This paper examines the impact of ownership on the actual contribution rate of corporate housing provident funds. Using a sample of A-share listed companies from 2008 to 2015, this study includes 3024 companies and 10,871 observations in total. The explained variable is the actual contribution rate of firms' housing provident fund, which is the proportion of enterprise housing provident fund contributions in the current year to the total wages of employees in the previous year. The main explanatory variable is ownership, which is categorized as state-owned enterprises and non-state-owned enterprises according to the nature of actual controllers. 12 other influencing factors such as local policies, enterprises characteristics and so on are also mentioned.

First, from the time dimension. The data shows that from 2008 to 2015, the actual HPF contribution rate of state-owned enterprises was 1.86 times (2008) to 2.23 times (2009) as high as that of non-state-owned enterprises, and the median was 2.0 times (2010) to 2.59 times (2013). The ownership gap is long-standing but has no obvious time trend. The regression results show that the gap between actual HPF contribution rate of state-owned enterprises and non-state-owned enterprises stabilizes at 2% for a long time. The quantile regression results show that the ownership gap exists at the contribution rate levels of 10%, 50% and 90%, showing a saddle trend. The Oaxaca-Blinder decomposition results show that the explainable part of the ownership gap is always lower than the unexplainable part, but it has risen gradually from 18.86% in 2008 to 36.56% in 2015.

Second, from the space dimension. The data shows that from 2008 to 2015, the actual HPF contribution rate of state-owned enterprises in east, central and west regions was 1.65 times (2015) to 1.93 times (2008), 1.68 times (2014) to 1.89 and 1.64 times (2010) to 1.89 times (2008) as high as that of non-state-owned enterprises respectively. The ownership gap persists but has no obvious time trend. The regression results show that the ownership gap in the east, central and west regions is 2%, 3% and 3% respectively. The quantile regression results show that the ownership gap in the east, central and west regions exists at 10%, 50% and 90% contribution rates, showing a saddle trend. The Oaxaca-Blinder decomposition results show that the explainable part of the ownership gap in the east, central and west regions is always lower than the unexplainable part, with the east accounting for of the highest 39.11% and the central region representing the lowest 17.83%.

This paper mainly has two contributions: 1) directly examine the impact of ownership on the actual contribution rate of firms' housing provident fund, and expand the research on the ownership gap of enterprise employee compensation from wages, social insurance, and enterprise annuity etc. to housing provident fund; 2) investigate the changes in ownership gap of enterprise housing provident fund from the time and space dimensions, and expand the study on contribution behaviors of firms' housing provident fund enterprise housing provident fund behavior from static to dynamic perspective. The above research provides a theoretical basis for predicting and intervening in the contribution of firms' housing provident fund.

Conclusions and discussions:

The results show that: 1) the market formation mechanism of differences in firms' housing provident fund contribution is gradually enhanced. In recent years, China's socialist market economic system has been continuously improved, and the market mechanism plays an increasing role in firms' micro-level decisions. The empirical research in this paper finds that from 2008 to 2015, the gap between the housing provident fund contributions of state-owned enterprises and non-state-owned enterprises has not widened, and the explainable part is increasing year by year. At the same time, from the geographical perspective, the market mechanism in the east region is more profound, the ownership gap is the smallest and the proportion of the explainable part is the highest. The results from time and space dimensions both indicated that the market formation mechanism of differences in firm' housing provident fund contributions has been gradually strengthened. 2) State-owned enterprises affect the housing provident fund compliance in a contradictory way. Quantile regression results show that the gap is more obvious among the firms with high and low contributions rates. For low-paying enterprises, the higher contribution rate of state-owned enterprises means that enterprises have higher compliance standards, policies are implemented, and employees' rights and interests are protected. State-owned enterprises have played a role as policy instrument. For high-paying enterprises, the higher contribution rate of state-owned enterprises means that enterprises are over-compliant, and employees' rights and interests are unequal. State-owned enterprises have widened the income gap.

同济大学与厦航联合成立“算法实验室”
借助人工智能提升民航运营效率

10月11日，“同济大学-厦门航空算法联合实验室”正式揭牌成立，这是我国首个聚焦民航领域的算法实验室，致力于通过人工智能解决航空企业面临的实际难题，提升整体运营效率。

同济大学副校长雷星晖、同济大学工程与产业研究院院长张亚雷、同济大学经济与管理学院党委书记金福安、院长李垣、厦门航空总信息师王洪建、厦门航空信息部党委书记蔡虹、党委副书记黄小荣、总工程师张宁等出席揭牌仪式。

联合实验室由同济大学经济与管理学院教授、博士生导师梁哲领衔。梁哲教授在航空算法领域深耕多年，积累了丰富的实战经验。去年6月，厦航联合阿里云举办智慧航空AI大赛，向全球征集大规模航班恢复问题的解决方案，梁哲教授带领的团队从全球1644支队伍中脱颖而出，赢得冠军。随后厦航与梁哲教授的团队开展深入合作，将方案落地实施。在今年台风导致的大面积航班延误中，相关算法正式启用，大幅缩短了航班恢复运行的时间。

同济大学副校长雷星晖表示，希望同济大学和厦门航空能够以此次合作为契机，共同实现跨越式发展，得到新经验，培养新英才，为我国民航事业的信息化、智能化、精准化做出新贡献，将联合实验室打造成为有产业特色、在行业知名的、具备核心竞争力的重点实验室，助力“中国梦”。

同济大学副校长雷星晖与厦门航空信息部总工程师王洪建共同为实验室揭牌

同济大学经济与管理学院院长李垣与厦门航空信息部党委书记蔡虹代表双方签署合作协议

厦门航空总信息师王洪建表示，联合实验室的成立，标志着厦航与同济将共同携手，以新技术、新模式为民航企业创造高效运营的新方法。双方将着力把联合实验室打造成为民航业内产学研深度融合、科技创新成果突出的成功典范，不仅为航空旅客的安全便捷出行提供智慧方案，更为国家民航事业、乃至全球民航业的科技创新发展贡献智慧力量。

梁哲教授介绍，联合实验室成立后，会继续研究大规模不正常航班的恢复问题，不断改进算法并尝试拓展。此外，航空公司的资源，包括飞机、机组、地面人员等，在计划阶段的规划配置以及在实施阶段的恢复重排，都将是实验室的课题，其中包括航线网络规划、飞机路径规划、机组排班等。

据介绍，该联合实验室设在同济大学校内，由双方指派人员组成管理委员会，实行管理委员会领导下的主任负责制。实验室科研人员包括同济大学的教授、博士生、研究生及厦航员工等，他们均具备运筹学理论基础与编程开发能力，以及航空相关项目经验。

当天下午还举行了媒体见面会。厦门航空总信息师王洪建向媒体介绍，厦航一直秉承自主创新理念，希望把握大数据、人工智能时代的变革契机。由梁哲教授开发的大规模航班恢复算法已经上线并应用于今年的台风季，效果显著。在合作过程中，双方发现不仅是航班恢复问题，民航领域的许多问题都可以借助运筹学得以优化。因此，希望依托同济大学优秀的管理科学学科平台与优质的人才资源，解决实际运营中的重要问题。

同济大学经济与管理学院院长李垣表示，学院具备多学科支撑优势，广泛国际合作和国际影响，以及丰富的企业及社会服务实践经验。去年学院提出要打造学院的教育生态，并将主动对接教育生态与企业产业生态。因此，学院将一如既往支持实验室建设，提供政策资源，保证资金和人力资源的投入。将来不仅为项目投入，学院将结合所有资源为企业投入，助力企业发展，服务回报社会。

梁哲教授表示，希望通过实验室的研究可以打破国外软件供应商对相关信息系统、智能决策系统等的垄断，不光自己用得好，希望将来能够把相关技术输出到国外，在国际上有中国航空运营软件，展现中国实力。

TONGJI UNIVERSITY AND XIAMEN AIRLINES JOINTLY ESTABLISHED "ALGORITHM LAB" IMPROVING THE OPERATION EFFICIENCY OF CIVIL AVIATION WITH AI

On October 11th, "Tongji University-Xiamen Aviation Algorithm Joint Laboratory" was officially unveiled. This is the first algorithm lab in China focusing on civil aviation. It is committed to solving the practical problems faced by aviation enterprises through artificial intelligence (AI) and improving the overall operational efficiency.

LEI Xinghui, Vice President of Tongji University, ZHANG Yalei, Dean of Tongji Engineering & Industry Institute, JIN Fuan, Secretary of CPC Committee of Tongji SEM, LI Yuan, Dean of Tongji SEM, WANG Hongjian, Chief Information Officer of Xiamen Airlines and CAI Hong, Secretary of CPC Committee of Xiamen Aviation Information Department, HUANG Xiaorong, Deputy of Secretary of CPC Committee of Xiamen Aviation Information Department, and ZHANG Ning, Chief Engineer of Xiamen Aviation Information Department attended the unveiling ceremony.

The joint laboratory is led by LIANG Zhe, a professor and doctoral supervisor of Tongji SEM. Professor LIANG has been deeply involved in the field of aeronautical algorithms for many years and has accumulated rich practical experience. In June last year, Xiamen Airlines and Aliyun held the Smart Aviation AI Competition to collect solutions for large-scale flight recovery problems. The team led by Professor Liang stood out from the 1,644 teams around the world and won the championship. Afterwards, Xiamen Airlines and Professor LIANG's team carried out in-depth cooperation and implemented the solution. In the large-scale flight delay caused by the typhoon this year, the relevant algorithms were officially enabled, which greatly shortened the flight recovery time.

LEI Xinghui, Vice President of Tongji University hoped that Tongji University and Xiamen Airlines will take this cooperation as an opportunity to jointly achieve leap-forward development, gain new experience, cultivate innovative talents, and make contributions to the informatization, intelligentize and precision of China's civil aviation industry; build the joint lab into a key laboratory with industrial characteristics, well-known in the industry and with core competitiveness; and contribute to the realization of the "Chinese Dream."

WANG Hongjian, Chief Information Officer of Xiamen Airlines, said that the establishment of the joint laboratory marks that Xiamen Airlines and Tongji University will join hands to create new methods for civil aviation enterprises to operate efficiently with new technologies and new models. The two sides will put forth efforts to make the joint laboratory a successful model of in-depth integration of industry-university-research cooperation in the civil aviation industry which attains outstanding achievements in scientific and technological innovations. It will not only provide intelligent solutions for the safe and convenient travel of air passengers, but also contribute wisdom to the scientific and technological innovation and development of the civil aviation industry nationwide and globally.

Professor LIANG introduced that after the establishment of the joint laboratory, it will continue to study the recovery of large-scale abnormal flights, and constantly improve the algorithm and try to expand it. In addition, the airline resources, including aircraft, crew, ground personnel, etc., configuration during the planning phase, and re-arrangement during the implementation phase, will all be the subjects of the laboratory, including route network planning, aircraft path planning, crew schedule and so on.

According to the ceremony, the joint laboratory is located in Tongji University. The director of the laboratory assumes overall responsibility under the leadership of a management committee which is composed of personnel appointed by both parties.

Researchers working in the laboratory include professors, doctoral students and graduate students from Tongji University, and Xiamen Airlines employees, all of whom have theoretical basis for operations research theory and programming development capabilities, as well as aviation related project experience.

A press conference was held in the afternoon. WANG Hongjian, Chief Information Officer of Xiamen Airlines, introduced to the media that Xiamen Airlines has always adhered to the concept of independent innovation and hopes to seize the opportunity of reform in the era of big data and artificial intelligence. The large-scale flight recovery algorithm developed by Professor Liang has been launched and applied in this year's typhoon season achieving remarkable results. In the process of cooperation, the two sides found that not only the flight recovery problem, but also many other problems in the civil aviation field can be optimized through operations research. Therefore, Xiamen Airlines wishing to solve these crucial problems in practical operations will rely on the excellent discipline platform-management science and high-quality talent resources of Tongji University.

LI Yuan, Dean of Tongji SEM, indicated that the school has the advantage of multi-disciplinary support, extensive international cooperation, and international influence, as well as rich practical experience in enterprises and social services. Last year, the school proposed to build the educational ecology, and will actively bridge the educational ecology and the industrial ecosystem of enterprises. Therefore, the school will continue to support the construction of laboratory, provide policy support, and ensure the investment of funds and human resources. In the future, the school will not only invest in projects, it will invest in enterprises through integrating all kinds of resources conducive to the development of the enterprises, and contribute to the society.

Professor LIANG expressed that he hopes the research of laboratory can break the monopoly of foreign software suppliers on relevant information systems and intelligent decision-making systems. It will not only benefit the Chinese market, but also export relevant technologies to foreign countries in the future that the Chinese aviation operation software will be used in the international market, showing the strength of China.

大数据更懂我们

一个清晨，某程序员还在沉睡，他的手环检测到主人的体征异常，将异常数据提交到台端，云服务器通过大数据分析发现：该程序员病了。手环收到主人的病讯及相关治疗建议后，向公司提交病假单，同时给主人预约了医疗服务。一切都在程序员的熟睡中完成。这就是大数据！它了解我们的生活、甚至情感；它通晓企业的经营，协助制定计划；它洞悉网络舆情、了解民众诉求，助力政府决策；它深谙经济市场，时刻提醒决策者规避风险，抢占先机。

王洪伟
同济大学经济与管理学院教授、博士生导师

什么是大数据?

大数据从概念兴起到应用落地，是一个水到渠成的过程。首先，虚拟化技术、大规模分布式数据管理技术、分布式的并行编程模式、面向服务的应用组装及管理、前端展现及交互技术的发展日新月异，为数据的产生、存储、处理提供了技术支撑。同时，互联网思维日益喧嚣，各路诸侯跃跃欲试。“互联网 +”导致企业视野更广，手臂更长，企业将触及前所未有的海量数据，同时应用场景也将层出不穷。

大数据具有四个特点：(1) 规模性。从现在的 TB/PB 级体量，很快就将进入 ZB 时代；(2) 异构性。类型丰富，既包括结构化数据，还包括图片、声音、视频等非结构化数据；(3) 时效性。数据采集和处理即时性强，满足市场的瞬息万变；(4) 价值性。针对实际应用场景，提出可落地的管理建议。

传统的数据，实质上是基于业务逻辑的小数据，来自企业信息系统，如零售商的进销存系统。在万物互联时代，大数据是由非结构化数据构成，这些数据比原来的结构化数据多得多，比如微信里的一张照片抵得上小型超市进销存系统一个月的数据量。目前，无线网络、可穿戴设备、物联网的普及，在丰富数据来源的同时，大大降低了数据采集成本。

大数据的社会影响

进入大数据时代，工业时代产生的社会结构和政治形态，都将被重塑。在过去，基础设施包括铁路、公路、机场、港口，而今智能终端、云计算、宽带网络扩展了其内涵；在过去，土地、劳动力、资本是核心生产要素，而今数据已成为最有价值的资产。在过去，基于产业链的分工体系和市场体系，存在着巨大限制，如资源、制造基地和市场在时空层面的隔离与不平衡，会产生高额成本，也会受到规模限制。而今，大数据推动了大规模协同与共享协作方式。

大数据的分析方法

大数据技术体系初具雏形，在采集、预处理、存储、处理、可视化展示等环节，形成了相对成熟的技术规范。然而，在商科背景下，我们更关注数据驱动的商业模式创新。传统的模型驱动的方法不再放之四海而皆准，尤其是在非结构化的大数据面前。

早期的数据分析基于归纳演绎法，后期产生了人工智能。大数据是异构性，包含图片、音频、视频。对这些数据进行处理，传统的工具远远不够。比如，自然语言处理技术可以根据一段语音判断其中包含正面评价或是负面评价，甚至判断情感，这种技术归属计算语言学。大数据分析同时还需要用到深度学习的概念，以及 LDE 模型等。

在商业领域，客户画像是精准服务的基础。用“瞎子摸象”作比喻，我们从不同角度获取鼻子、耳朵、腿等部位信息，经过筛选和组合，一头完整的大象就展示在我们脑海中。在操作层面，需要进行跨屏整合。个人手机、办公电脑、家庭电视、可穿戴设备……通过“Super ID”，把同一个人在不同时间点、不同屏幕背后的信息整合起来，这个人就变成“透明人”了。年初，央行成立了“百行征信”，旨在整合互联网巨头的数据，面向全社会提供征信服务。此外，国内诸多城市成立数据交易中心，为数据资产的交易提供平台。

值得一提的是，除了丰富的数据来源，还需要知识库指导数据分析。比如，网络留言在用词和语法上相对随意。比方说，“计算机”和“电脑”是同一个概念；再比如，在不同语境下，“苹果”可能是指电脑品牌，也可能是指水果。为此，我们需要将领域知识事先提取，构建知识管理系统，将这些概念联接起来。基于建成的知识库，进行后续知识推理。

大数据能给我们带来些什么？

也许大家还没有感觉到，现在的普通人比 100 年前的皇帝还要幸福！现在，这个幸福指数将通过大数据的普及而得到进一步的提高！

先看在线购物。顾客会参考商品评论，有些评论甚至超过十万条，我们不可能逐一阅读，因此会错过有用的信息。目前，我们的研究能够对商品评论进行抓取，自动提取产品特性（如面板、操作系统、待机），最终实现面向特征的细粒度意见挖掘。相比于问卷调查的演绎法，这种方法没有样本数量限制，没有样本偏差，实时性更强。

再看股市。股民会参考股评专家的评论，但是也会有这样的疑虑：专家的评论是真的吗？我们的研究解决了这个问题：从股票论坛上抓取股评数据，总结他们对具体板块或者股票涨跌的看法，将这些数据与后市数据比较，在此基础上，可以判断专家的评论是真是假。

对于企业经营模式，大数据也将带来彻底的颠覆。过去，公司运营是问题驱动的，而大数据时代，则是由数据驱动。在过去，企业管理模式是发现问题、数据分析、找到答案、解决问题；现在的管理者可以直接从数据中找规律，为己所用。例如，给产品“画像”后的数据，管理者可以和竞争对手的数据比较，了解自身产品优劣，对产品缺点改进，最后针对产品优势做精准推广。

互联网公司的盈利模式也在改变。本质上，互联网公司就是数据公司，不论从事什么业务，最关键的就是收集数据。在过去，主要靠广告盈利；现在则通过数据分析，向客户推送定制服务。除此之外，还可以对用户数据进行分析，将结果转卖给利益相关方。

在公共管理领域，大数据可以大显身手。在国内，约 80% 的有用信息（自然人、法人、空间地理、宏观经济）掌控在政府手中，但政府数据治理能力薄弱，如果加大数据开放力度，由企业参加数据处理，将有效推动全社会数据产业的发展，同时也会助力智慧城市建设。

对于医疗领域，面临的现状是：老龄化趋势、慢性病增加、亚健康人群庞大。随着智能芯片、传感器以及可穿戴设备的兴起，无数的设备可以即时监控人体的健康信号，例如：呼吸、脉搏、血压、睡眠等。这些数据可以与云端数据进行对比，得到身体健康状况的信号，该数据也可以为医生临床诊断提供辅助。根据美国临床肿瘤学会报告，IBM Watson 对癌症的治疗方案与医生的建议十分吻合。23andMe 通过基因分析，给出用户染色体属地、构成和基因中可能带有的患病风险。

大数据并非十全十美

（1）理论基础问题。相关关系不能取代因果关系，大数据使用归纳法，而非传统的演绎法，强调事物的相关性，主动忽视因果关系。比如，经典应用“啤酒和尿布”，啤酒和尿布具有相关性，至于哪个是因，哪个是果，商家并不关心，他们只关心两者的相关性带来的销量。（2）隐私保护问题。大数据的使用者会以攫取的心态使用数据，将我们在不同屏幕、不同系统、不同时间、不同空间的行为足迹加工组合，我们将变成“透明人”，个人的隐私安全堪忧。目前，商家利用大数据“杀熟”现象时有发生。在美国，利用社交平台洞悉网民心理，预测甚至干涉总统大选，都需引起警觉；（3）需求问题。很多企业对业务需求不明确，寄希望大数据挖掘出点什么东西。在缺少明确需求情况下，大数据难以发挥作用；（4）数据质量问题。不少企业时刻产生大数据，却忽视数据的预处理，数据治理制度缺失，缺少 ETL 流程，导致数据处理不规范，最终影响数据质量；（5）大数据人才匮乏，大公司掌握着先进的大数据技术，但是缺乏教育资源，训练有素的从业人员并不多。中小企业尽管存在数据，但是没有合适的人力资源，无从下手。

大数据的未来

大数据产业：产业链已经形成，就像餐厅点菜。专业的数据公司出售大数据，就像菜市场的批发食材；有些公司出售加工过的数据，就像饭店厨师按需加工；也有些公司负责底层技术支持，就像供给锅碗瓢盆一样。随着技术进步，大数据公司的数据加工能力会越来越高。

人才培养：数据科学专业时不我待。美国常春藤联盟以及国内部分高校已经开设相关专业。最近，我们正在跟数学系联合筹备数据科学专业，新专业将融合管理学、统计学和信息科学知识，培养的学生不仅胜任系统开发，还能够对企业内外部的数据进行综合分析处理。

开放共享：互联网的开放性决定了会有海量数据涌入。管理者应因势利导，原先“围墙”内的东西是我的，在大数据时代，整个世界的数据都能为我所用。此外，大数据产业的发展离不开标准。由于数据维度的差异，数据方难以互联互通，因此有必要形成统一的标准。

前景行业：未来 5-10 年，智慧医疗、普惠金融、城市治理、工业制造的应用场景将会越来越丰富，必将成为大数据产业新一轮发展的着力点。

最后强调一点，大数据只是一个阶段性的概念，不久的将来，所有的数据都是大数据，也就不存在所谓小大数据之争。数据驱动的企业发展模式和社会管理模式是大势所趋。为此，商学院应该未雨绸缪，提前布局，将这种思维模式引入到教学科研之中。

WANG Hongwei
Professor of Tongji SEM, Doctoral Supervisor

BIG DATA KNOWS US BETTER

One morning, when a programmer was still fast asleep, his wristband detected the abnormal signs of his body and hence sent the abnormal data to the cloud. Through big data analysis, the cloud server found that the programmer was ill. Upon receipt of the notice of its master's illness as well as relevant treatment advices, the wristband sent the sick leave request to the company and reserved medical services for the programmer. All these things happened when the programmer was sleeping. This is big data! It knows our life and even emotions; it knows about operation of enterprises and can assist in business planning; it has insights into Internet public opinions and appeals, and assists the government in decision making; it understands thoroughly the economic market, and always remind decision makers to avoid risks and seize opportunities.

What is big data?

It takes no extra effort for big data to develop from the stage of conception to application. First, the leapfrog development of virtual technology, large-scale distributed data management technology, distributed patterns for parallel programming, service-oriented application assembly and management, and front-end display and interaction techniques etc. have provided technological support for the generation, storage and processing of data. Meanwhile, with the increasing popularity of Internet thinking, all the Internet giants are very eager to take actions. The "Internet+" model has given enterprises wider perspectives and longer reaches. Enterprises will have access to unprecedentedly huge amount of data, and the application scenarios will also emerge in an endless stream.

Big data can be described by four characteristics: (1) Volume. The volume will soon develop from TB/PB-level into ZB level; (2) Variety. The large variety of data contains not only structured data, but also unstructured data such as photo, audio, video etc.; (3) Velocity. The data is captured and processed in real-time to meet the ever-changing demand of the market; (4) Value. Big data can propose practical management advices based on actual application scenarios.

The traditional data is virtually the business-logic-based small data that comes from enterprise information system, e.g. the inventory management system of retailers. In the era of "Internet of Everything", big data is consisted of unstructured data which are much bigger than the original structured data. For example, one photo in the WeChat app is equal to the data amount of a small supermarket's inventory management system for one month. Nowadays, the popularization of wireless network, wearable devices and Internet of Things greatly reduces the cost of data acquisition while enriching the data sources.

Social influence of big data

Stepping into the era of big data, the social structure and political ideologies generated from the industrial era will both be reshaped. In the past, infrastructure included railways, roads and airports, but nowadays its connotation has been extended by intelligent terminals, cloud computing and broadband network; in the past, land, labor and capital were core production factors, but now data has become the most valuable asset. In the past, the industrial-chain-based labor division system and market system had massive constraints. For instance, the separation and imbalance of resources, production base and market on the space-time dimension would result in high costs, and were also subject to the limit of scale. However, big data now greatly promotes mass collaboration and shared collaboration mode.

Analytical methods of big data

The technological system of big data is taking shape and has formed relatively mature technical specifications in such processes as acquisition, pre-processing, storage, processing and visualized display etc. However, in the business context, we pay more attention to the data-driven business model innovation. The traditional model-driven method is not universally applicable any more, especially when confronted with unstructured big data.

The data analysis in early stage was based on inductive and deductive approaches, followed by the rising of artificial intelligence in recent years. Big data is heterogeneous, and includes photo, audio and video etc. The traditional tools are not enough for processing of these data. For example, the natural language processing technology can judge whether an audio clip contains positive or negative feedbacks, and even judge emotions. This technology can be categorized into computational linguistics. Big data analysis will also use the concept of deep learning and LDE model etc.

In business area, user portrait is the basis for precise service. Using the story "Blind Men Feeling An Elephant" as a metaphor, we obtain information of all parts of the elephant such as nose, ears and legs etc. from different perspectives, and a whole elephant will appear in our mind after selection and combination. At the operational level, cross-screen integration will be needed. Mobile phone, PC, TV and wearable devices..... will integrate a person's information at different time points and behind different screens, which make him a "transparent man". At the beginning of this year, the People's Bank of China launched Baihang Credit, a platform which aims to integrate the data of Internet giants and provide credit-reporting services to the society. Moreover, many domestic cities have established data transaction centers to provide transaction platforms for data assets.

It is worth mentioning that in addition to rich data sources, a knowledge base will also be needed to guide the data analysis. Online messages are relatively casual in terms of wording and grammar. For instance, "computer" and "electronic brain" are exactly the same concept. And "apple" can refer to a PC brand or a kind of fruit under different contexts. Therefore, we need to pre-extract domain-specific knowledge and construct knowledge management systems to connect these concepts. The subsequent knowledge reasoning can be carried out on the basis of the established knowledge base.

What can big data bring to us?

Maybe you are still not aware that the ordinary people nowadays are happier than the emperors over 100 years ago! Now the happiness index will be further promoted through the popularization of big data!

First, let's look at online shopping. Customers need to refer to commodity comments. Some commodities even have over 100,000 comments which we are unable to read one by one. Therefore, we are likely to miss some useful information. Nowadays, our research can grab commodity comments, automatically extract product features (e.g. panel, operating system, standby), and finally realize the feature-oriented fine-grained opinion mining. Compared to the deductive methodology of questionnaire survey, this method has neither the limit of sample quantity nor sample biases, and thus has better real-time performance.

Then let's see the stock market. Investors may refer to the comments made by experts, but they will also have such concern: are the experts' comments real? Our research has solved this problem: grab stock comment data from online stock forums, summarize their opinions on the rise and decline of specific boards or shares, and compare these data with future market data. On such basis, we can judge whether the experts' comments are real or fake.

Big data will also bring about thorough disruption to the operation mode of enterprises. In the past, the company operation was problem-driven rather than being data-driven in the era of big data. In the past, the management mode of enterprises is to discover problems, analyze data, find solutions and solve problems; while modern managers can directly find regular pattern from the data for their own use. For example, managers can compare the product "portrait" data with competitor's data. Hence, they will know the advantages and disadvantages of their products, make improvements to the disadvantages, and finally carry out precise promotion based on product advantages.

The profit model of Internet companies is also changing. In essence, Internet companies are data companies, and their most critical task is to collect data whatever businesses they are undertaking. In the past, they mainly made profits by advertisements; while nowadays they mainly push customized services to clients through data analysis. Moreover, they can analyze the user data and resell the results to stakeholders.

Big data can also play a vital role in the area of public administration. In China, about 80% of the useful information (natural person, legal person, space geography, macro-economy) are controlled by government. However, the data governance capability of government is weak. If government increase the level of data opening and involves enterprises in data processing, it will effectively promote the development of data industry of society, and meanwhile advance the construction of smart city.

The current situation facing the medical area is: trend of population aging, increase of chronic diseases, and huge sub-health population. Along with the rising of smart chips, sensors and wearable devices, numerous devices can perform real-time monitoring of the health signals of human body, e.g. breath, pulse, blood pressure and sleep etc. These data can be compared with the cloud data to generate signals about human health condition, and can also assist doctors in clinical diagnosis. According to the report of American Society of Clinical Oncology, the cancer treatment plan proposed by IBM Watson matches perfectly the doctor's advices. Through gene analysis, 23andMe will be able to indicate the disease risks that could possibly be contained in the territories, composition and genes of user chromosomes.

Big data is not yet perfect

(1) Problem of theoretical foundation. Correlativity cannot replace causality. Big data uses inductive method, rather than the traditional deductive method. Inductive method emphasize the correlativity of things, while actively neglect the causality. For example, in the classical application "Beer and Diapers", beer and diapers are correlated. But merchants do not care about which causes which. They only care about the sales increase caused by the correlativity between the two. (2) Problem of privacy protection. The big data users will use data with an intention to grab something, processing and combining our behavioral footprints in different screens, different systems, and different time and space. In this way, we are made "transparent men" and the safety of our personal privacy is quite worrisome. Nowadays, it is quite common that merchants take advantage of their regular customers by the use of big data. In the U.S., people should be alarmed by the phenomenon that social platforms are used to penetrate the mentality of netizens, and predict or even interfere in the presidential election. (3) Problem of demand. Many enterprises are not clear about their business demands, and hope big data could dig up something. Big data cannot exert its role well without clear demands. (4) Problem of data quality. Many enterprises are constantly producing big data, but neglect the pre-processing of data. The absence of data governance system and ETL process has resulted in non-conforming data processing, which finally affects the data quality. (5) Lack of talents in big data. Big companies possess advanced bid data technology, yet do not have well-trained professionals due to the lack of educational resources. Although small and medium-sized companies have data, they have no qualified human resource to handle big data.

The future of big data

Big data industry: The industrial chain has formed, just like ordering in restaurants. Specialized data companies sell big data, just like wholesaling of food materials in the marketplace; some companies sell processed data, just like chefs cook as needed; other companies are responsible for the support of underlying technology, just like providing cookware. With the advancement of technologies, the data processing capabilities of big data companies will be increasingly stronger.

Talent development: The specialty in data science is urgently needed. The Ivy League universities in the U.S. and some universities in China have already set up relevant specialties. Recently, SEM is preparing for the establishment of data science specialty in conjunction with the Mathematics Department of Tongji University. The new specialty will combine the knowledge of management, statistics and information science, and the students are trained to be competent not only in system development, but also in comprehensive analysis and processing of data inside and outside the enterprises.

Open sharing: The openness of Internet determines the influx of huge amount of data, and managers should make the best use of the situation. In the past, all the things within the "wall" only belong to us, while in the era of big data, the data of the whole world can be used by us. Moreover, big data industry cannot develop without standards. Data providers are unable to interconnect with each other due to the difference in data dimensions. Therefore, it is necessary to form unified standards.

Promising industries: In next 5-10 years, the application scenarios of smart healthcare, inclusive finance, urban governance and industrial manufacturing will be increasingly richer, and will surely become the focal points of a new round of development for big data industry.

Lastly, I would like to emphasize that big data is just a periodic concept. In the near future, all data will become big data, thus there won't be any disputes between big data and small data. The data-driven enterprise development mode and social management mode have become the irresistible trend. Therefore, business schools should have forethought and make early arrangements to introduce this mode of thinking into teaching and research.

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吴忠东
同济大学 EMBA 学员
中国财产再保险有限责任公司上海分公司总经理

真正的 leader 靠实力说话

说起再保险行业，很多人并不熟悉。普通保险公司保的是个人险、财产险等，再保险公司则是为保险公司提供进一步的风险安排和风险转移。吴忠东在这一行工作二十多年，从之前中国再保险公司的基层员工，一步步成长为中国再产险上海分公司总经理，业务范围覆盖华东六省一市。

时光回到 2000 年，那时他刚被北京总部派遣到上海。之前公司所有的业务人员和资源都集中在北京，上海市场是一张白纸。吴忠东笑言，“商业化、市场化过程就像垦荒一样，总部能给到的支持很有限”。当时，整个上海专业团队只有六七个人，要负责全部华东市场的业务拓展，“属于有目标没方向，但心里头都知道只要去努力肯定是有回报的，所以大家的积极性都很高，很有一种创业的激情在里面”。为了开展业务，吴忠东和他的同事甚至会通过各种关系和方式联系先发送资料，再一家一家去拜访公司，业内人士称之为“盲拜”。就这样去充分挖掘任何可能的机会，只用了一年时间就将营业额做到了 5000 万。到 2018 年底，上海分公司的再保险保费收入将有望达到 60 亿元。

面对呈指数型增长的业绩，吴忠东在肯定团队努力的同时一直在强调“受益于整个中国经济的发展，以及保险市场需求在扩大”。这与吴忠东诚恳的本性有关，他从不愿过多地去夸赞或渲染与己身无关的东西。作为目前上海分公司的负责人，在谈到团队管理时，吴忠东表示：“再保行业其实是一个非常传统的行业，从产品形式、运用模式来说都是非常稳定的，几百年来都没有太大的变化，因此欧美这些先行国家其实已经制定了非常系统和成熟的规章制度，在管理上我们更多地是去引进成熟的管理经验”，崇尚在制度规定先行的基础上“无为而治”的他对自己管理者的角色轻描淡写。

听上去似乎吴忠东不愿做 Leader，但在行业内他却是实打实的“Leader”。在再保行业，大合约都会有一个 Leader，即首席再保人。简单来说，如果有一家保险公司需要同时找十几家再保公司去帮它分散风险，这十几家再保公司需要有一个 Leader，作为代表，去跟保险公司谈条件。

Leader 掌握着市场话语权，也决定了一家再保公司的市场地位。在华东市场吴忠东和他领导的再保险团队担任了主要合约业务的首席再保人；作为 Leader，吴忠东和他领导的团队会去做到他看重的公道，一方面不能为了取悦客户而定价过低，导致其它再保公司受损，另一方面也要做到让所有均分收益的再保公司能共担风险。这些年来，吴忠东和他的团队在定价上有非常精准的专业判断，又在风险分担上把握得当，一直深受同行信赖；即便是在激烈的市场竞争环境中，面对国际再保险巨头，其 Leader 的地位受到很大的挑战，但吴忠东和团队凭借自身多年累积的经验和信誉做到持续稳定地引领市场。

吴忠东认为自己的性格比较收敛和内向，平时喜欢思考和观察，并不觉得自己一定要去做 Leader。但如果有时候需要自己站出来承担责任时，吴忠东总是义不容辞。就如 EMBA 新生拓展分组时，需要有人来承担队长的角色，大家都推举吴忠东，吴忠东看着大家信任的目光，便承担了下来，在整个活动中一直带领和引导大家完成任务，赢得大家的喜爱与信任。

同济与我天生匹配

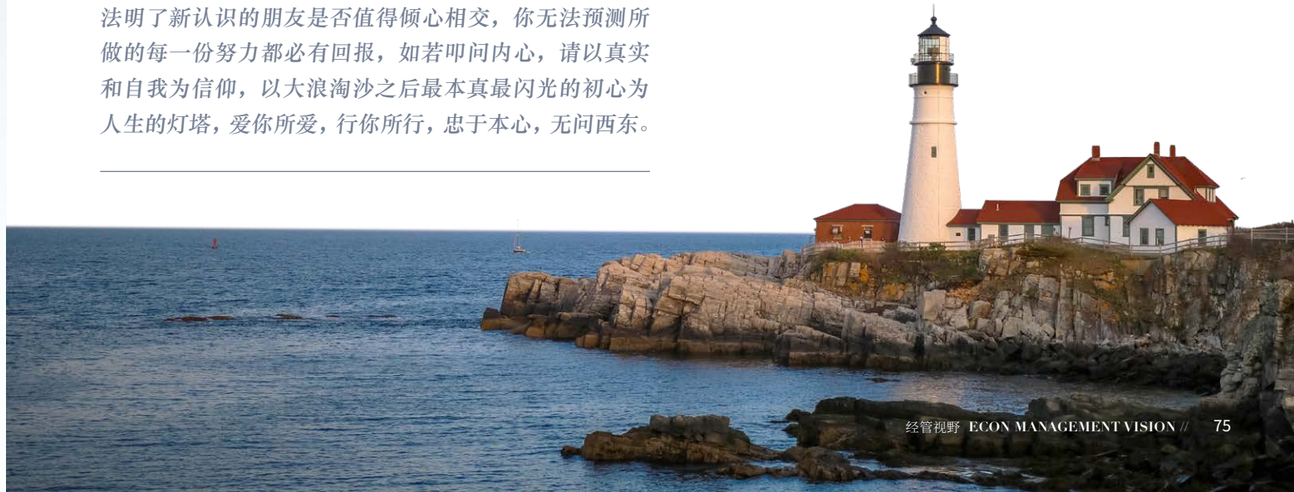
在再保行业深耕多年，吴忠东对行业一直保持着敏锐的观察和深刻的思考。虽然说再保行业是个有着六七百年历史且发展都相对稳定的传统行业，但最近几年市场还是发生了很多的变化，而这些变化又非常值得再保人去关注。

目前在美国等成熟财产险市场，车险占 1/3，责任险占 1/3，其它险种占据 1/3。而中国的情况是：车险占到 70%，责任险不到 5%，农险 5% 左右，其它险种占据约 20%。吴忠东坚信将来随着新兴科技的发展，尤其是物联网的发展，车险会发生很大的变化。无人驾驶作为自动驾驶的最终阶段，事故率会大大下降，原来车险更多保的是车身，但车身碰撞很少，所以车险的价值重心会转移到其它部分。因为一辆车是数千个供应商提供的产品组成的，特别是一些电子系统，将来如果是出现事故，很可能最大的问题是责任，以责任险为主的险种将有很大的上升空间。

正因为科技在冲击着每个行业，而再保行业包括保险业，几乎涉及到社会的所有行业和民生，比如航天航空新能源等都需要保险。因而，当再保行业出现业态或形态上的变化时，思维仅停留在保险行业是无法解决问题的。吴忠东希望在保险行业之外，能有一种通透的可以审视全局的思维和眼光。他非常庆幸自己选择了同济 EMBA，“我的工作可能会涉及到各个行业，实际上从产业链来讲，同济涉及得是最广的，而且同济的土木工程、城市规划、项目管理、风险管理、汽车产业等都非常好、非常强”。“同济展示出的协作互济、执着坚守和匠人精神一直深深地吸引着我，感染着我。将来能有幸成为实业与金融业之间的桥梁与通道，也是我读同济 EMBA 的目的之一”。

吴忠东用“匹配、务实和靠谱”来形容对同济 EMBA 的印象。“同济的风格是内敛甚至是低调的，刚好我的个性也是这样。同时呢，我觉得同济 EMBA 能够拓展多样性，我希望自己能再打开一些放松一些，这也契合我的需求”。吴忠东还特意提到了一件小事，新生拓展的晚宴上，戈友会有举行义卖，吴忠东当时为了表示支持，代表新生举牌拍下了一件物品。因酒酣耳热，忘记了后续付款，待第二天回想起来后，才被告知物品已由拓展时的小伙伴集体凑款，当做礼物送给他这位“老大哥”。“我非常感动，包括拓展和相聚大家都处得很好。我相信，未来大家长期相处的话，友谊会更持久”。当然，事后在他的坚持下，吴忠东以红包的形式把钱退还给了小伙伴们。

人生是一条单行道，从来都不允许后退和逆行。你无法知道自己做的关于事业上的决定是对还是错，你无法明了新认识的朋友是否值得倾心相交，你无法预测所做的每一份努力都必有回报，如若叩问内心，请以真实和自我为信仰，以大浪淘沙之后最本真最闪光的初心为人生的灯塔，爱你所爱，行你所行，忠于本心，无问西东。



True leaders lead with strength

Speaking of reinsurance, many are unfamiliar with it. What common insurance company deals with is individual insurance, property insurance etc., while reinsurance company is to provide insurance company with further risk arrangement and risk transfer. Wu Zhongdong has been working in this industry for more than 20 years, and has gradually grown from a grassroots employee to the general manager of China Reinsurance Shanghai Branch, business covering six provinces and one municipality in East China.

Back to 2000, Wu Zhongdong was just dispatched to Shanghai from the headquarters in Beijing, when all the company's business personnel and resources were concentrated in Beijing while Shanghai market was still a virgin land. "The commercialization and marketization process is like reclaiming wastelands, with limited support from the head office," said Wu. At that time, there were only six or seven people in the Shanghai professional team, who were responsible for the business development of the whole East China market. "It was a period of time with goals yet no directions, but everyone knew in heart that it would definitely pay off if they endeavored, so everyone had high enthusiasm and a passion to start a business." To develop business, Wu and his colleagues even sent out their company materials through various connections and means, and then visited the company clients one by one, which the insiders call "blind visits". Through fully exploring any possible opportunities, it only took one year to achieve a turnover of 50 million. The reinsurance premium income of the Shanghai branch is expected to reach 6 billion yuan by the end of 2018.

In the face of the exponential growth in performance, Wu Zhongdong, while acknowledging the team's efforts, stressed "the benefits of the development of the whole China's economy and the expanding demand of the insurance market". This is related to the sincere nature of Wu, who is never willing to praise too much or overstate something irrelevant tohimself. As the head of the Shanghai branch, when talking about team management, Wu said, "The reinsurance industry is actually a very traditional industry, which is stable in terms of product form and application mode for hundreds of years. As a result, the advanced western countries have developed systematic and mature rules and regulations, and we are more likely to introduce mature management experience", understating his role in management by advocating "laissez-faire" on the basis of systems and regulations.

It sounds like Wu Zhongdong doesn't incline to be a leader, but he is a solid leader in his field. In the reinsurance industry, each large contract has a leader, namely the leading reinsurer. In simple terms, if an insurance company needs to find more than a dozen reinsurance companies at the same time to help for risk diversification, while these reinsurance companies need to have a leader to negotiate with the insurance company as a representative. The leader holds the discourse power in the market and decides the market status of a reinsurance company. Wu Zhongdong and his reinsurance team serve as the leading reinsurer of main contractual businesses in the East China market. As a leader, Wu Zhongdong and his team try to do what they value: on the one hand, they cannot make the price too low for the customers' interest, which would diminish other reinsurance companies' profit. On the other hand, they have to make all the companies that share earnings can share the risks as well. Over the years, Wu Zhongdong and his team have been trusted by their peers for their accurate professional judgment on pricing and proper risk sharing. Even in the fierce market competition environment where the leader's position is greatly challenged by international reinsurance giants, Wu and his team have been leading the market continuously and stably with their accumulated experience and reputation.

Wu Zhongdong regards himself as an introverted person that likes thinking and observing rather than tending to be a leader. But sometimes when it needs someone to take responsibility, Wu Zhongdong would stand out with no doubt. For example, during the EMBA teambuilding activity, Wu was recommended by his teammates to take the role of team leader, so he took the role and instructed the team to complete the task, winning others' admiration and trust.

True to Heart, Never Hesitate

WU Zhongdong
Executive MBA student at Tongji University
General Manager, Shanghai Branch of China Property & Casualty Reinsurance Co., Ltd.

A perfect match between Tongji and me

In the reinsurance industry, Wu Zhongdong has maintained a keen observation and profound thinking on the industry. Although the reinsurance industry is a traditional industry with relatively stable development of 600 or 700 years, there have been many changes in the market in recent years that are worthy of our attention.

In the mature property insurance market nowadays such as the United States, car insurance, liability insurance and other types of insurance account for one third relatively. While the situation in China is: car insurance occupies 70%, liability insurance is less than 5%, agricultural insurance is about 5%, and other types occupy about 20%. Wu believes that in the future, with the development of emerging technologies, especially the development of the internet of things, car insurance will be greatly changed. As the final stage of autonomous driving, unmanned vehicles will reduce the accident rate. The original car insurance cares more about the car body which is nevertheless rare in crash, so the core value of car insurance will shift to other parts. As a car is made up of products provided by thousands of suppliers, especially some electronic systems, the biggest problem is probably the liability in future's accidents, and the insurance coverage mainly based on liability insurance will have a great rising space.

Technology is impacting every industry, and reinsurance and insurance industries are almost related to all industries and people's livelihood. For example, insurance is needed everywhere such as aerospace, aviationand new energy industry. Therefore, when the reinsurance industry changes in form of operation or models, it is impossible to solve the problem focusing only on the insurance industry. Wu Zhongdong hopes to have a clear and comprehensive view of the overall situation outside the insurance industry. He is very glad to have chosen Tongji EMBA program: "My work may involve various industries, and in fact, Tongji covers the widest range in terms of the industrial chain. Moreover, Tongji is very strong in civil engineering, urban planning, project management, risk management and automobile industry etc." "The spirit of cooperation, persistence and craftsmanship of Tongji has deeply attracted and impressed me. I would be honored to be the bridge and channel between industry and finance in the future, which is also one of my aims to attend Tongji EMBA program."

Wu Zhongdong described his impression of Tongji EMBA as "matching, pragmatic and reliable". "The style of Tongji is introverted and even low-key, just like my personality. Meanwhile, I think the program can expand diversity, and I hope I can open up and relax a little bit more, which is also in line with my needs. Wu specially mentioned a small incident during a charity sale held in the opening banquet for new EMBA students. Wu ordered an item on behalf of the new students to show his support, but forgot the follow-up payment because of drinking. When he remembered it the next day, Wu was informed that the item had been paid collectively by his buddies in the teambuilding activity and was given to him as a gift. "I was very moved by the friendship we had developed in teambuilding and group activities. I believe that our relationship will be long-lasting when we know each other better over time in the future." Of course, later on, Wu Zhongdong insisted in returning the money to his buddies.

Life is a one-way street where you are never allowed to retrograde or go backward. You cannot know whether your career decision is right or wrong, you cannot see whether the new friend is worthy of your heart, and you cannot predict if every effort would pay back. Please ask yourself honestly, have faith in sincerity and ego, and follow your original genuine intentions as the lighthouse. Love what you love, do what you like to do, and stay loyal to your heart without least hesitation.

从营销视角看吸引人才的策略

张一明
同济大学 MBA 校友;
华澳国际信托有限公司 总裁助理

刘备三顾茅庐的故事可谓是家喻户晓。千百年来，我们将这个典故奉为求贤若渴的经典。刘皇叔的“诚意揽才法”也成为人才招聘者纷纷效仿的套路。但我们再仔细分析一下，在“隆中对”这个面上的明局里，我们看到的是诸葛亮在向刘备展现“躬耕南阳而知天下三分”的韬略。但是从背后的暗局看，诸葛亮其实早已全面地评价过了刘备，而刘备也早已在三国风起云涌的群雄里树立起了自己的雇主品牌。

首先，刘备作为“汉室宗亲”的身份符合诸葛亮的政治立场。第二，刘备自身能力一般但极能容人用人，动辄与下属同榻而卧、抵足而眠，对手下能臣以兄弟待之，极为信任。第三，刘备认识到了诸葛亮是一个战略性的全面人才。刘备手下虽有猛将但急缺谋臣。诸葛亮的全面才干在刘备那里能够很快成为头号谋士。年轻的诸葛亮若要辅佐曹操，在郭嘉、荀彧等如银河璀璨的谋臣里，估计很难立刻脱颖而出。第四，刘备的事业起点低但潜力大，他的队伍战术素养高但战略能力差。所以诸葛亮一旦获得刘备的信任和授权，他所给出的战略性意见就能发挥出显著作用，将刘备集团的潜力极大地激发出来。第五，刘备“兴复汉室”的愿景与诸葛亮有高度的共鸣，同时也能成为日后聚拢“心系汉室”的人才的一面旗帜。因此，诸葛亮评说：曹操占天时，孙权据地利，而刘备拥人和。

诸葛亮用一篇“隆中对”成功地把自己“推销”给了刘备，但如古语所说“良禽择木而栖，贤臣择主而事”。刘备又何尝不是一个“超级销售”呢？他通过展现优点，挖掘痛点，激发共鸣点，成功地吸引“卧龙”先生加盟了当时还“寄人篱下”、“一穷二白”的刘备集团。

面对拥有众多候选人的人才市场，我们每一个 HR 其实都是在做“销售”的工作。我们所营销的是我们公司的空缺职位。我们选用这些人才也是一种购买行为。他们所付出的代价是时间成本（青春年华）和机会成本（错失机遇）。

既然我们把“招募”类比为“营销”，那就让我们套用 4Ps 营销理论（The Marketing Theory of 4Ps）来分析一下吧。首先是产品（Product）策略，我们所要营销的产品就是我们公司要招募的职位，以及这个职位的工作内涵。所以我们吸引人才的第一步一定是充分挖掘我们公司以及这个职位的卖点，它对于候选人最大的吸引力是什么？第二是价格（Price），招聘职位的薪酬，即这个职位的市场化定价。这个定价一定要根据我们的雇主品牌和我们的人才策略进行差异化定位。第三是渠道 (Place)，我们要找到合适的候选人，一定要找到合适和高效的招聘渠道。一个好的招聘渠道（比如猎头）能够很好地帮助我们做人才吸引的工作；同时，我们也要管理好这些招聘渠道，防止他们在人才吸引方面过度承诺或屏蔽信息。第四是宣传（Promotion），这包括了各项雇主品牌宣传的工作。我们要在人才市场上树立起公司的事业愿景、品牌形象、人才观念和文化氛围等。

我们还可以再参考一下 4Cs 营销理论。4Cs 分别指代 Customer（顾客）、Cost（成本）、Convenience（便利）和 Communication（沟通）。

第一个 C，提示我们要挖掘候选人的诉求点。

他希望通过跳槽最想获得的是什么？我们这个职位的工作能满足他的诉求吗？候选人所求无外乎名与利。“名”就包括了职位抬头、权力空间、品牌影响等因素，而“利”除了薪酬以外，还包括学习机会、成长通道乃至生活平衡等。一方面，我们对候选人需要不断挠到痒处；另一方面也需要因势利导地向候选人“包装呈现”我们的卖点。

第二个 C，提示我们要关注候选人的痛点。

他如果要离开现在的工作，最想逃避的痛苦是什么？他离开现在的职位，所要放弃或付出的代价是什么？我们现在所提供的职位是否能帮他规避那些痛苦？我们如何让他理性地权衡，他所必须付出或放弃的东西都是值得的。我们需要精准地抓住痛点不松手，不断强化候选人的离开现职意愿。

第三个 C，提示我们要给候选人提供便利点。

让候选人更便利地了解我们和融入我们。每一次的面试安排、每一步入职推进都如同那句著名广告词中所写的——“精于心，简于形”（Sense and Simplicity），让候选人顺畅又自然地走完全部面试录用流程。和候选人的每一次亲密接触都是雇主品牌的建设过程，体现了公司对人才的渴望和尊重。顺畅的流程推进既是公司整体运行效率的体现，也是不断了解候选人心态变化，及时跟进纠偏的控制手段。

第四个 C，提示我们要与候选人形成共鸣点。

我们要和候选人进行深层的沟通，用事业愿景来让公司和候选人结成利益共同体，乃至命运共同体。与候选人的沟通目标首先是信息对称，然后是建立信任，之后才是达成共识乃至形成共鸣的过程。

以上所谈到的主要是引才工作的思考维度和工作视角。限于篇幅，有效吸引人才的那些套路、方法和技巧还没有向大家一一拆解。我们看到，无论是要做到待遇、感情、事业这“三个留人”，还是要做到诉求点、痛点、便利点和共鸣点者这“四点齐发”，都是一项庞大的系统工程。对人才的有效吸引，是公司整体能力的体现，也是公司人才观的体现，更是公司文化价值的体现。

ZHANG Yiming
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President's Assistant of Sino-Australian International Trust Co., Ltd.

TACTICS OF ATTRACTING TALENTS FROM A MARKETING PERSPECTIVE

Liu Bei's three visits to Zhuge Liang's thatched cottage is a household story. For thousands of years, we have regarded this allusion as a classic of seeking talents with eagerness. Liu's "sincere talent attraction" has also become a common practice for talent recruiters. If we further analyze the story, in the circumstance of "Longzhong Plan", what we see on the surface is Zhuge Liang's presentation to Liu Bei of his military strategy in "knowing the world to an extent though farming in Nanyang". However, from a deeper point of view, Zhuge Liang had already comprehensively evaluated Liu Bei, and Liu Bei had also set up his own employer brand among the rising warlords of the Three Kingdoms period.

First of all, Liu Bei's identity as the "imperial relative of the Han Dynasty" conformed to Zhuge Liang's political stand. Secondly, Liu Bei was extremely good at tolerance and use of personnel in spite of his ordinary personal ability, treating his subordinates as brothers with extreme trust. Thirdly, Liu Bei realized that Zhuge Liang was a comprehensive strategic talent. Although having valiant generals, Liu's team was short of strategists. That is to say, Zhuge Liang's all-round talent would make him the top strategist soon in Liu Bei's team while in another warlord Cao Cao's team, young Zhuge was hardly supposed to quickly stand out among the galaxy of counselors including Guo Jia, Xun Yu and so on. Fourthly, Liu Bei's career started at a low point but with great potential. His team had high tactical attainment and yet poor strategic ability. With the trust and authorization of Liu Bei, Zhuge Liang's strategic opinions could play a significant role, which greatly stimulated the potential of Liu Bei's group. Fifthly, Liu Bei's vision of "restoration of the Han Dynasty" was highly consistent with that of Zhuge Liang, which also could become a flag of gathering the talents "loyal to the Han Dynasty" afterwards. Therefore, Zhuge Liang commented: among the Three Kingdoms, Cao Cao has the good timing, Sun Quan enjoys the graphical convenience, and Liu Bei possesses the support of the people.

Zhuge Liang successfully sold himself to Liu Bei using a "Longzhong Plan". However, as the old saying goes, "Fine birds choose their perches, and wise men choose their masters." From this point of view, isn't Liu Bei a "super salesperson"? He succeeded in attracting Zhuge Liang to join his group, which was still "dependent on others" and "poor and blank" at that time.

Facing the talent market with many candidates, each HR personnel is actually doing the work of "salesperson". What we market are the vacancies in our company. Our selection of talents is also a buying behavior. The price they pay is the time cost (youth time) and opportunity cost (missed opportunity).

Since we're comparing "recruiting" to "marketing," let's analyze it using The Marketing Theory of 4Ps. The first is the Product strategy: the product we want to market is the vacancy we want to recruit for and the job content of the position, so our first step in attracting talents must be fully exploring the selling points of our company and the position. What is the greatest attraction for candidates? The second is Price, the salary of the position, namely the market pricing of the position. This pricing must be differentiated based on our employer brand and talent strategy. The third is Place. To find suitable candidates, we must find suitable and efficient recruitment channels. A good recruitment channel (such as headhunters) can help us do a good job in attracting talents. Meanwhile, we should also manage these recruitment channels well to prevent them from over-promising or blocking information in terms of talent attraction. The fourth is Promotion, which includes all kinds of employer brand publicity work. We should set up the company's business vision, brand image, talent concept and cultural atmosphere in the talent market.

We can also refer to The Marketing Theory of 4Cs. 4Cs refer to Customer, Cost, Convenience and Communication respectively.

The first C prompts us to explore the candidate's **appeal points**. What does he/she want most from job-hopping? Does the work of our position meet his/her appeals? Fame and fortune are what candidates want normally. "Fame" includes factors such as position title, power space, and brand influence etc. Besides salary, "fortune" also includes learning opportunities, growth channels and life balance. On one hand, we have to constantly "scratch the itch" for candidates. On the other hand, we need to "package and present" our selling points to the candidates properly.

The second C indicates that we should pay attention to the candidates' **pain points**. What pain would he most want to escape if he were to leave his current job? What will he give up or pay for leaving his present position? Could the position we are offering help him avoid that pain? How shall we get him to rationally weigh what he has to pay or give up is worthywhile? We need to hold on to the pain points accurately and continuously reinforce the candidate's willingness to leave his current position.

The third C advises us to provide **convenience points** to candidates, making it easier for them to get to know us and integrate with us. Every interview arrangement and each step of employment process is just like what the famous advertisement says: "Sense and Simplicity", letting the candidates go through the whole interview and employment process smoothly and naturally. Every close contact with the candidates is a process of building our employer brand, reflecting the company's desire and respect for talents. The smooth process is not only a reflection of the overall operating efficiency of the company, but also represent the control means to continuously understand the change of candidates' mentality and timely follow up for error correction.

The fourth C suggests that we should form **sympathy points** with the candidates. We need to have deep communication with the candidates, and bring the company and the candidates into a community of common interests and even a community of common destiny with our business vision. The first goal of communication with candidates is information symmetry, second is trust, and then the process of reaching agreement and even sympathy.

The above is mainly about the thinking dimension and work perspective of talent attraction. Considering the space limitation, the patterns, methods and techniques that effectively attract talents cannot be herein demonstrated. We can see that it is a huge systematic project to attract candidates with either remuneration, personal affection and career, or the emphasis on "four points" such as appeal point, pain point, convenience point and sympathy point. The effective attraction to talents is not only a reflection of the company's overall ability and talent concept, but also an embodiment of the company's cultural value.

谈判与突破性思维

思维能力是人类强于一切其他生物的显著特征，人类社会的每次进步都来自思想创新，每一次划时代的飞跃都源自突破性思维的压倒性胜利。

突破性思维，我们也称之为批判性思维、创新型思维、创造性思维等，是人类社会前进的驱动力，也是个人成功的第一要素。几乎每个领域的杰出人物都有共同的特点：他们经常会冒出与其他人不一样的想法，并积极主动地把这些想法付诸实践，愿意为自己的勇敢行为承担一定的风险。这些不一样的想法便是思维的独创性和突破性。

在谈判学领域同样如此，谈判高手并不是那些唇枪舌剑，气势汹汹的人，相反，他们从表面上看并不一定特别出众。他们谦虚冷静、平和低调、稳重大方；他们擅长倾听和微笑，懂得理解和体谅，不自私不贪婪，不投机取巧，也不急功近利；更加重要的是，他们视野开阔，思维开放，为了满足各方的真实需求和价值最大化，敢于越过任何拘束和羁绊，以突破性的思维方式追求最优的解决方案。

谈判可以发生在工作与生活的任何一个场合，例如与同事合作解决工作问题时，推销或者采购产品和服务时，和邻居发生了冲突和某种不愉快时，教育儿童如何养成好的习惯时，说服交警不要开罚单时等。于是，“谈判大师”们就开始撰写各类“教科书”，列出各式各样的谈判案例，将标准的解决方案传授给读者。却忘了经验只能服务于现在，唯有观念才能决定未来。这时候便出现了三个问题。第一，这些谈判案例真的相差无几吗，表面的细微差异是否掩藏着本质的不同呢？第二，针对看似相同的问题，采用同样的解决方案真的最合适吗？第三，如果遇到教科书上没有的案例该怎么办？

无论是理论还是实践，对于类似的谈判案例采取类似的谈判策略，并不是最佳的方法。这种建立在僵化机制上的做法不能给我们带来超预期的成效。我们不愿被动接受事态的发展和未知的结果，而是采取主动的谈判方式去寻找解决方案，希望通过谈判得到更好的结果，超越我们的原始需求。这也是为什么 Stuart Diamond 将他的经典著作取名为《Getting More》(该书的中文译本却取名为《沃顿商学院最受欢迎的谈判课》不太合理)。

想要 Getting More，就需要突破性思维。虽然可以通过标准流程和习惯做法坐享其成，但谈判的价值无从体现，唯有突破思维才能创造更大价值。

为确保某种瓶颈性产品的稳定供应，我和供应商谈判的结果是：我方参股对方的中国制造工厂。某公司的计划部经理向老板提出加薪，谈判的结果是：老板全力支持他攻读中德合办的国际 MBA，其中在国外一个半月的学习时间按照正常工作支付薪水。一位父亲多次缺席家长会，班主任颇为不满，与儿子沟通后，他答应在学校的年末晚会上扮演小丑。在这些真实的谈判案例中，谈判的结果虽然和最初的设想不一样，但是突破性思维带来了令众人都满意的结果。

特立独行的思维方式，经常会给我们带来惊喜。按照心理学的解释，产生惊喜的情绪的原因是我们得到了超过预期的东西。然而，突破性思维并不仅仅意味着稀奇古怪的想法，那些只为标新立异、哗众取宠的言行不在我们的讨论范围之内。相反，突破性思维应该是反复实践后的刻苦思索、不断精进，从而可以在反观内心后向外突破。找到了事情的根本，就能找到问题的关键，就能找到解决问题的最佳方法。这才是突破性思维的真正价值。一位优秀的汽车销售员对我说：很多人都问我为什么能推销这么多汽车？但我从来没有推销过一部汽车，我只是陪着我的客户一起选择最适合他们的车子。这个销售员找到了客户的根本需求：买一辆最适合自己的车。

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同济大学 MBA 校友;
博川基因有限公司 华东区总经理

那么应该如何训练，开发突破性思维能力?

有很多词语和突破性思维相关：直觉、本能、好奇心、潜意识、灵感、闪现、顿悟等。譬如佛教的顿悟，要经历多年苦苦修行才可求得解脱。每一次突破都建立在实践和摸索上。很多天才宣称他们的灵感闪现于睡梦中、洗澡时、马桶上、散步时。偶尔做脑筋急转弯练习也是个好习惯，让我们的脑子灵活运转。我个人的习惯是，一旦有了新的想法，便记录下来。

还有一种建议是学会像儿童一样思考，儿童的思维不囿于传统观念或规则制度，跳跃出理性和逻辑的束缚，其感性思维和想象力犹如烟花，绚烂无比，这恰恰是成年人最缺乏的。以成年人僵化的思想遏制儿童的想象天赋是愚蠢的做法，而这确很常见。

在谈判中经常会遇到各类困难，有时会让整个谈判寸步难行。这时候的正确做法是：不要勉强，也不必将就，不要过于烦恼和纠缠。让谈判停下来，将所有困难轻轻放下，稍作休息，调整好心情。保持最富有创造力的精神状态，才能让思维信马由缰，换个角度重新看待要解决的问题和解决方案。这样做可以让我们冷静下来，等待突破性的灵光一现；还可收集更多的信息，寻求更多的帮助，以更巧妙和高效的方式满足需求，创造价值。

Neil ZHANG
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NEGOTIATION AND BREAKTHROUGH THINKING

Thinking ability is a remarkable feature that makes human beings superior to all other creatures. Every progress of human society comes from ideological innovation, and every epoch-making leap comes from the overwhelming victory of breakthrough thinking.

Breakthrough thinking, also known as critical thinking, innovative thinking and creative thinking, is the driving force for advance of human society and the first element of individual success. Great people, in almost every field, have something in common: they often come up with ideas that are different from others, and take the initiative to put those ideas into practice, willing to take risks for their own brave behaviors to a certain extent. These different ideas are what we call the originality and breakthrough of thinking.

A similar scenario is also observed in the field of negotiation, where the best negotiators are not the aggressive and contentious ones; on the contrary, they are not necessarily extraordinary superficially. They are modest and calm, peaceful and low-key, prudent and generous. They are good at listening and smiling, understanding and being considerate. They are not selfish or greedy, nor opportunistic or eager for quick success. More importantly, they have broad vision and open mind, daring to go beyond any constraints and fetters to pursue the optimal solution in a breakthrough way of thinking for the real needs of all parties and value maximization.

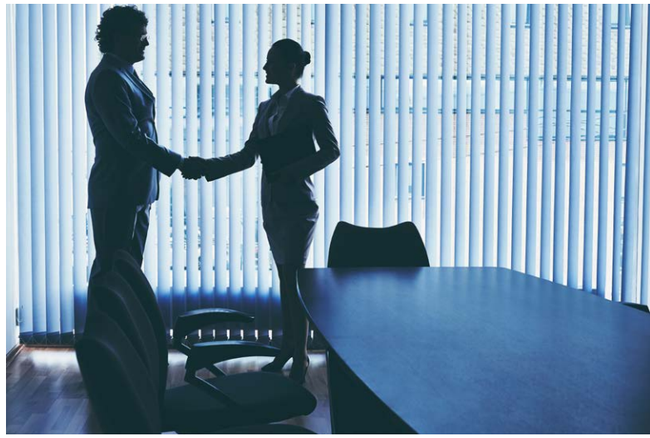
Negotiations can happen in any circumstance of work and life, such as working with colleagues to solve work problems, selling or purchasing products and services, experiencing conflicts or some kind of unhappiness with neighbors, educating children to develop good habits, and persuading a traffic police officer not to issue tickets, etc. As a result, "negotiation masters" begin to write various "textbooks" listing various negotiation cases and teach standard solutions to the readers, regardless of the fact that experience only serves the present while concept determines the future. Three problems arise in the mentioned scenario: First, are these cases really the same? Do the nuances of the surface conceal the essential differences? Second, is it really appropriate to adopt the same solution for seemingly identical problems? Third, what about cases not covered in textbooks?

Whether in theory or in practice, it is not the best approach to adopt a similar negotiation strategy for similar cases. The practice, which is based on rigid mechanism, does not bring us much more than we expected. We are willing to take the initiative to negotiate to find a solution, hoping to get better results through negotiations and transcend our original needs, rather than passively accept the situation development and unknown results. That is why Stuart Diamond named his classic Getting More (the Chinese version of the book is named Wharton's Most Popular Negotiation Courses, which is not a rational choice).

Getting More requires breakthrough thinking. We may enjoy the benefits through standard procedures and customary practices, but the value of negotiation cannot be embodied. Only breakthrough thinking can create greater value.

In order to ensure a stable supply of certain bottleneck products, the result of our negotiation with the supplier was that we would participate in the equity of their manufacturing plant in China. The planning department manager of a company proposed to his boss for a raise in salary. The result of the negotiation was that the boss fully supported him in attending a Sino-German international MBA program, during which he was granted one and a half months' paid leave for his study abroad. One father was absent from the parents' meeting for seven times, and made the headteacher quite dissatisfied. After communicating with his son, he agreed to play the clown at the school's annual party. In these real negotiation cases, although the results of negotiation are different from the original expectation, the breakthrough thinking brings results satisfactory to all.

A maverick way of thinking often surprises us. According to psychological explanation, the reason for emotions of surprise is that we have got more than we expected. However, breakthrough thinking doesn't just mean outlandish ideas. Words and deeds designed to be unconventional and provocative are not part of our discussion. On the contrary, the breakthrough thinking should be the hard thinking and continuous improvement after repeated practices, thus breakthroughs can be made outward after self reflection. It is the real value of breakthrough thinking to find the root of the matter, to capture the essence of problems, and thus to find the best solution to them. A good car salesman said to me: "Many people ask me why I can sell so many cars. However, I've never tried to sell a car, and I've just helped my clients to choose the car that best suits them." The salesman has found the fundamental needs of customers: to buy a car that would suit him best.



SO HOW TO TRAIN AND DEVELOP BREAKTHROUGH THINKING ABILITY?

There are many words associated with breakthrough thinking: intuition, instinct, curiosity, subconsciousness, inspiration, flash, and insight, etc. The buddhist insight, for example, takes years of hard practice to achieve liberation. Every breakthrough is built on practice and groping. Many geniuses claim their inspiration occurs in their dreams, or strikes when they take a shower, sit on the toilet, or have a walk. It is also a good habit to do brain teasers occasionally to keep wits. My personal habit is to write down new ideas once they come into my mind.

Another suggestion is to learn to think like a child. Children's thinking is not confined to traditional concepts or rules and regulations, but jumping out of the constraints of rationality and logic. Their perceptual thinking and imagination are like fireworks, which are exactly what adults lack most. It's foolish to stem a child's talent for imagination with the rigid mindset of an adult, which is though a quite common practice.

In negotiations, we often encounter various difficulties, sometimes making the whole process stuck. The right thing to do at this moment is: do not force, do not necessarily compromise, and do not worry too much and pester. Let the negotiation suspend, gently put down all the difficulties, take a break, and adjust your mood. Keeping your mind at the most creative status helps refresh your minds, thus treating the problems and solutions from a new perspective. Doing so can calm us down and spur the breakthrough inspiration. Also, more information can be gathered and more help can be sought to satisfy needs and create value in a more artful and efficient way.

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英国《经济学人》(The Economist) 7 月 3 日发布了 2018 全球 EMBA 排名 (Executive MBA Rankings 2018)。

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ECON MANAGEMENT VISION
ISSUE 007 JAN 2019
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